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J. W. HEFFERNAN
Northampton, Mass.

Sciurus bocourti bocourti M. Edw.

Coll. 331 **

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MS. 724

Notes on Siamese Mammals.

Sciurus bocourti bocourti M. Edw.

Rev. Zoo. 1867, p. 193.
Central Siam.
ad ♂ Sam Kok, C. Siam.
Grizzled black and warm buff above, latter color on the nape and head. Undersurface is white, color spreading over muzzle and projecting backwards to surround eyes; also extending over much of the upper sides of the hands and feet; excepting throat and forelimbs, it is thickly sprinkled with chestnut hairs, which suggest that the lower parts are in a state of change between that color and white. Ears are partly white partly ochraceous. Basal two-thirds of tail is like the back but much more coarsely annulated, the terminal third is annulated black and chestnut with the base of the hairs black and ochraceous.

S. floweri has the same type of coloration as S. bocourti and measurements agree so closely that it is here placed under synonomy.

	H. B.	T.	H. F.
♀	192	171	43

Bangkok specimens.
ad ♂ Occiput, nape, back, basal half of tail above, black very finely and slightly speckled with white in places, black extends narrowly down middle of upper part part of the forelimbs, and more broadly over the thighs; crown and distal half of tail above mixed black and white. Remaining parts white.
im ♀ Like above but back brownish black finely speckled with rufous; distal three-fourths of tail banded black and rufous throughout, with a few white hairs near the tip. Remaining parts white.
ad ♂ Above ferruginous annulated with black

H. T. H. E.

1922 171 43

under parts rufous (burnt sienna) tail proximally ochraceous and black distally mahogany red.

ad ♀ Like above without black on head, fore limbs and ankles with mahogany red of the tail extending along the lower surface to the root.

ad ♂ Bang Pa In, near Ayuthia, C. Siam.

Above a grizzle of black and buff, warmest on nape, darkest on rump and tail. Ears, top and sides of muzzle, cheeks and above eyes, sides of neck, sides of forelimbs and upper surface of foreamms, lower sides and ankles white; fore and hind feet grayish. Entire tail white. Tail above coarsely grizzled black and buff with numerous white hairs, below pale grayish. This specimen is almost a topotype as Ayuthia is the type locality.

Wroughton, Ann. Mag. Nat. Hist. 1908 (8) II, pp. 399-400.

Sciurus bocourti. Ayuthia, north of Bangkok, Me Nam River north to Pichit, beyond this replaced by S. b. sinistralis. (S. leucogaster, is a young form of this.)

Ground color, M. Edw. "un fauve roux et noiratre" - grades from almost black thru seal brown and chocolate to a quite pale smoke gray, grizzled with pale buff. Under surface white in some extends to feet, in others to face and head, some to tail. Abnormal - no white, belly chestnut, no sub-basal pale patch on tail.

H. B.	T.	H. F.	E.
192	198	43	20.

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Sciurus bocourti sinistralis Wroughton
Op. cit. p. 399.

Slightly smaller than S. bocourti.
Gen. color above - black or "clove brown" grizzled finely with buff, few all white hairs over back. Face including ears, suffused with bright "hazel". Under surface near hazel, hands and feet dark, almost black. Tail short distance (30 mm.) like back, then (45 mm.) almost white, hairs white with black tips, rest bright "bay", obsolescent black and buff barring at bases of hairs.

H. B.	T.	H. F.	E.
191	190	43	20

Hab. Me Nam River, below Pichit north to Pitsanulok. North of this replaced by S. b. dextralis.

Sciurus bocourti dextralis Wroughton.
Op. cit. p. 400.

Larger than sinistralis or bocourti. More all white hairs than in sinistralis (similar in color) almost half white, face brighter. Under surface dark shade of cinnamon- rufous approaching chestnut.

H. B.	T.	H. F.	E.
206	184	46	20.

Hab. Lower Me Ping Valley, Kampeng. Junction of Me Ping and Me Nam northward to Raheng, north of this runs into S. b. lylei and S. b. gruti.

Sciurus bocourti lylei

Largest of bocourti forms.
Gen. color smoke-gray, individual hairs mouse gray basally, then white, large proportion with black tips. Face and head faintly washed with orange-rufous. Tail basally (50 mm.) colored like the back, then (50 mm) white, finally bright cinnamon-rufous. Hands and feet finely grizzled black and white. Under surface pale bright orange-rufous.

H. B.	T.	H. F.	E.
213	200	49	20

Hab. Chiengmai, on the Me Ping.

Distinguished by absence of either red or brown in the coat, the bright orange-rufous belly, obsolescence of red on head, paler hands and feet.

S. b. bocourti	Gr. L.	Bas.	Pal.	Diast	Mol.	I. Orb.	Zyg.	Br. C.	Nas.
♀ Sam Kok, C. Siam.	48.8	40.5	19.7	10.8	9.7	17.2	29.4		13.3x
♂ Bangkok	—	—	21.5	11.2	9.9	18.	30.		14.5x
♂ "	—	—	21.	11.	10.2	18.	30.		14.4
♂ "	—	—	19.	10.5	8.9	17.	27.5		12.3
♀ "	—	—	—	10.7	9.0	19.	—		11.5
♂ Ayuthia, (Bang Ta Ma)	48.	41.	20.7	11.	9.8	18.2	29.6		14.5
♂ 17759 S. bocourti 254781 B. Hin Ngom.	54.5	51.	24.	14.	10.	20.8	34.		17.
	51.	46.5	21.5	11.4	9.8	18.2	31.	24.4	14.x3.5x7.
Ayuthia	50.	39.		11.2	10.5	18.5	31.	23.	15. x3.5x7.7
S. b. sinistralis	49	38		11.	9.6	18.	30.	2[illegible].6	14. x4.3x7.
S. b. dextralis	52	41.5		12.	10.3	18.3	30.	24.	18. x3.5x7.3
S. b. 256861 ♀ S. Kao Lem	54.	49.	[illegible]	12.	11.	19.5	32.5	—	14.[illegible] x 4 x 7.[illegible]

	Gr. L.	Bas.	Pal.	Diast.	Mol.	I. Orb.	Zyg.	Br. C	Nas.
Callosciurus hippuru 19174 ♂	58.8	56.	27.	15.5	10.5	18.5	35.	26.	17x5.5x9
19173 ♀	59.	56.	26.5	15.	10.5	19.	35.5	26.5	18x5. x8
19172 ♂	58.	54.	25.5	15.	10.	19.	35.	25.	17x4.8x8
14223 C. hippuru [illegible]	[illegible]	44.	[illegible]	14.	10.	19.	35.	25.	17. x4. 8.5
[illegible] 8.490 ♀ C. hippuru [illegible]	55.5	53.	[illegible]	14.5	10.5	[illegible]	34.6	25.5	17 x 4 x 8.
[illegible] B 1443 U.S.N.M. ♀	57.5	54.	26.	14.5	10.	16.5	34.7	25.5	16.4 x 5 x 7.5
[illegible] 11273 ♀ U.S.N.M.	60.	56.5	27.	15.5	10.	19.5	36.6	25.	17.2 x 4.6 x 8.5
[illegible] 57.	57.	55.	27.	15.	10.6	20.7	37.4	26.	16 x 4 x 8.

Masked Palm Civets.

19256 sub-ad. ♂
Khoa Luang, 3400ft. S. W. Siam.
Meas, 1472-676-68-32
Skull. 126-126-67-41-26-26-24-3-19.5-24x14
62-44-45-10x9-7.5x8.5
Measurements of skull and skin too large for Paguma larvata intrudens.
No sub-ocular eye patch, no white tip to the tail, mask grayish, slim line to crest. rufous tinge, nape and shoulders black. Not P. l. robusta, as one skin from Khao Bhanam Bencha is typical of the Trang, Peninsular Siam form.
Paguma larvata janetta the Tenass. form not recorded from this far east but this skin fits the description.

19173 in. ♂
Khao Bhanam Bencha, 3500ft. Pen. Siam
Meas. 119.5-118.5-61.39-23-24-22- -17-23x15
57-40-42-9x8.5-7x7.5
Color not at all like robusta, dark rusty brown, throughout, underfur soiled tawny, nape and shoulders brownish black, pre-aural patch yellow, tail tip yellowish cream, no superciliary or sub-ocular patch, under parts rusty not cream, feet black.

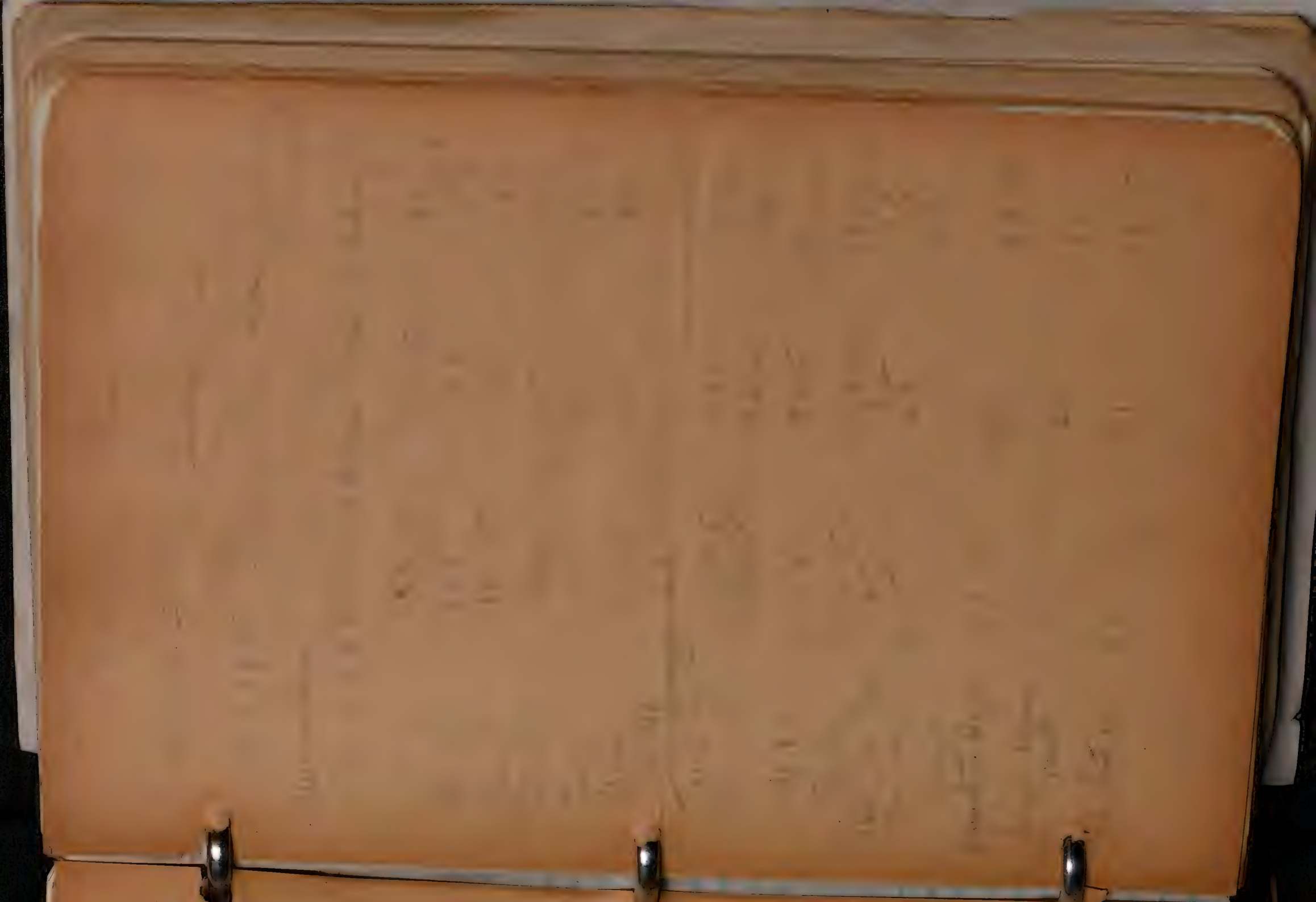
Kao Soi Dao - Paguma robusta
Kao Chong " "

Papuana Cavata Cohuila 19[illegible]
♀ ad. Khao Bhanam Bencha
3500 ft. Peninsular Siam

Skull	T.L.	Zyg.	C.W.	Waist	Mbl.	Sag.C.	Palla
	131	71	41	22	25.5	5	20

Mesopt.	Pal.	Pal.W.	Malar.	Pm 4	M 1
23×15	57	40	42	9×8.5	7×7.5

Typical light form.



Color - dark above and blue
very little above tail -
nape and head
white line on cheek not
forward, above eye, lores white,
under coat dull dirty buff
two slight lines of white
on throat. small dark
brown spot on chin
Spot of pale buff on forward
shoulder upper tail coverts not
extended really dark
brown.

Perognathus longimembris kinoensis
Bahia Kino, Sonora.
Throughout most of the arid desert of northern Sonora.

Perognathus amplus rotundus
Wellton, Yuma Co., Arizona.
Most of the northwestern desert area of Sonora - Papago Tanks.

Perognathus baileyi baileyi
Magdalena, Sonora..
Most of Sonora except higher mountains in the east.

Perognathus penicillatus oricei
Oposura, Sonora.
Most of northern Sonora, except the higher mountains in the east. Papago Tanks, Siera Pinacate.

Perognathus intermedius pinacate
Papago Tanks, Sierra Pinacate.
Dark colored lavas of Pinacate region north into Arizona.

(Tomentum)?

Callosciurus hippurus [illegible]
1222 Mag. de Zool. Cl. 1, [illegible]
Cpl. 6 (Java).

Color. Back and sides of body top of neck from behind ears and upper surface of in excess and sometimes inclining to tawny on the lower back and shoulder, outer surface of forearm, sides of rump, and outer surface blackish slate, very slightly speckled with a dull whitish color, brighter than that of Ridgway. Tail generally dull black sometimes inclining to brownish black coarsely grizzled at the base above with the [illegible] of the upper parts and at the base below slightly grizzled white.

Spec. Paris Mus. Java ♂ 280-220-60(57) ♀ 290-235-65(61)
Malacca ♀ 300-255-60(57)

84433 ♀ 260-255-63 Trang
83490 ♂ 240-260-62 "
112,731 ♀ 258-255-63 - Schaw

19173 - Tawny black and white on both front and hind legs. Cp. the front legs.

84390 ♂ Trang, Lower Siam 12/25/96
H.B. 9½ T. 10¼ –
112731 ♀ Johore, Tanjong 8/5/01
Sikakap E. Coast.
H.B. 258 – T. 255
84443 – ♀ Trang, Lower Siam 12/12/96
H.B. 10¼ T. 10. Wgt. 1 lb.
Dr. W. L. Abbott.

P. Jacanti —

254621 ♀ E. Siam Kao Lum —

Hugh M. Smith

H.F. 55 (52). 12/26/20

Back grizzle of black buff, brownish cast — head [illegible] brownish, less black — Tail terminal 2/3 a reddy brown — [illegible] lip dark but wider bands of [illegible] hairs making perceptible band. Feet under parts yellowish white under surface of tail yellowish white. See [illegible] to 17759 ♂ except that he that one there is no grizzling; white hairs interspersed with mahogany red. Size much greater than S. Jacanti hind foot 58 (52) not 46 (44)

Spec. from C. Siam — Seem nearer pattern of back varying shades of dark gray sprinkled with white hairs tail more of [illegible] pure white or white with few brownish hairs. Hind foot smaller however, 50 in [illegible]

254751 ♂ E. Siam B. Hin Neam

H.F 52 —

H. M. Smith

Warm pelage but some grizzle effect gray and white [illegible] [illegible] gray.

Skull 17759 — Much heavier throughout larger, post orbital processes heavier

and longer nasals end practically on the same line as the premaxillaries not anterior as in the two U.S.N.M. skulls. Bulbe marked construction not present in others

Natrix melanopepla leucogenys
Smith-eastern Siam
Proc. Zool. Soc. Lond. 1916 p. 43.

Pale yellow coloration, large yellow patch on hind foot. Yellow of fore limb greater in extent.

1. Lyon - Smithson Miscl. Coll.
Vol. 50 Part 1 pp. 24-29

Notes on Some Squirrels of the S. hippurus group with descriptions of two new forms

S. (C.) hippurus - Java -
Tang, Pasir Sian

S. (C.) hippurus -
Harrison West Coast Sumatra
Bisitan River, E. Coast "

S. (C.) grayi - Tonkin Borneo
(Hoa and Tonkin down back)

S. (C.) hippurellus - just like
(S. hippurus) Western Borneo -

2. Lyon, Proc. U.S. Nat. Mus. Vol. 45
pp. 1-885 Plates 1-11. 1913.
Treasurers: Ay Accounts of the
Mammalian Family Sciuridae.

Get these on Catalog Collection

3. Mam. Collected by Dr. W. L. Abbott on Borneo and some of the Small Adjacent Islands.
Proc. U.S. Nat. Mus. 1901
Vol. 40 pp. 53-146 Pl. 1-7.

4. Pigmy Squirrels of the Nannosciurus melanotis Gray.
Proc. Biol. Soc. Wash.
Vol. 19 pp. 51-56 May 1, 1906.

5. Notes on the Slow Lemurs.
Proc. U.S. Nat. Mus. Vol. 31,
pp. 527-535 pl. 13 Nov. 1, 1906

6. Descr. of four new Tree shrews.
Proc. Biol. Soc. Wash.
Vol. 24, pp. 167-170, 1911.

7. Rem. on Insectivores of the Genus Gymnura.
Proc. U.S. Nat. Mus.
Vol. 36 pp. 449-456 pls. 34-37
May 27, 1909.

8. Old Notes on Mam. of the Phil. Ling. Archipelago with descriptions of new species and a Revised List
Proc. U.S. Nat. Mus. Vol. 32
pp. 479-491, pl. 39 June 1, 1909

9. A New Squirrel-Lemur Direction Island South China Sea
Proc. U.S. Nat. Mus. Vol. 36
pp. 519-10, June 7. 1909

10. Mam. collected in Eastern Sumatra by Dr. W. L. Abbott during 1903, 1906 and 1907, with descriptions of new species and subspecies
Proc. U.S. Nat. Mus. Vol. 31
pp. 619-679, pls. 52-56 Sept. 14 1908.

11. Mam. collected in Western Borneo by Dr. W. L. Abbott.
Proc. U.S. Nat. Mus. Vol. 33
pp. 547-572 Dec. 24 1907

Notes on the Porcupines of the Malay Peninsula and Archipelago.
Proc. U.S. Nat. Mus. Vol. 32 pp. 575-594 pls. 54-57
June 29, 1907.

Rem. on the Giant Squirrels of Sumatra with description of Two new species.
Proc. U.S. Nat. Mus.
Vol. 32 pp. 439-445 pl. 33
May 23, 1907.

A New Flying Squirrel from the Island of Terutau, West Coast of Malay Peninsula
Proc. Biol. Soc. Wash.
Vol. 20, pp. 17-18 Feb. 23, 1907

The Squirrels of the Sciurus vittatus group in Sumatra
Smith's Misc. Coll. Vol. 48
Pt. 3. No. 1660 pp. 277-283
Feb. 4. 1907

Descriptions of a New Squirrel of the Sunrise prevostin Group from Pulo Temoja, West Coast of Borneo
Smith. Misc. Coll. Vol. 48 part 3 No. 1659 pp. 277-283 Feb. 6 1907

Mam. of Batam Is Rhio Archipelago
Proc. U.S. Nat. Mus. Vol. 31 pp. 853-657 Jan. 16 1907.

Mam. of Banka, Mendanau and Billiton Island betw Sumatra and Borneo
Proc. U.S. Nat. Mus. Vol. 31 pp. 575-612, Dec. 18, 1906.

T. m. rodolphi - Nong Yang
Kao Sabat

Petaurista Cylei - Khun Tan Mt.
Pteromys (Hylopetes) near albonigen
Doi Angka

Ratufa melanopepla sinus Koh Kut
" " " leucogenys Nong Khai
Nong Mong Nuang.
Kao Sabat.

" gigantea stiginosa Doi Naugha
Doi Hua Mok
" Hum.

" M. peninsularis Bandon
Tha To "
Baugnara
Trang
Kao Soi Dao.

Ratufa pyrsonata - Baugnara
Kao Soi Dao.

Callosciurus ferrug. herberti Nongkhai
Sabrosa Khalin

Mammals Of New Mexico.

From:
Mammals of New Mexico,
by Vernon Bailey
North American Fauna #53. 1931

Life Zones of New Mexico
and Texas.

Lower Sonoran Zone.

Mesquite is the typical plant,abundant grass; semi-arid. In extreme arid sections,creosote bush and scanty grass between Pecos and Rio Grande. Also the century plant,lechuguilla,mescal plants of Guadalupe Mts.,cactus,soaol,all form soil-rich and mellow on valleys,stony and baked on mesas.
Mammals: Citellus,Onychomys,Peromyscus, Perognathus,Dipodomys,Geomys,Thomomys, Lepus,and others.

Upper Sonoran Zone.

West of Pecos-foothills and lower slopes of the mountains,North East slope of the Guadalupes. Gives place to transition at about 6,000 ft. Plants: Nut pines,junipers and oaks on slopes,no mesquite on plains,or other Lower Sonoran plants.
Mammals: Citellus, Lynx rufus,Onychomys, Peromyscus, Neotoma,Thomomys,Perognathus Dipodomys,Lepus,Skunks and Badgers.

Transition Zone.

On the Guadalupe Mts. from 6,000 ft. up.Yellow pine, juniper,nut pine and oaks characteristic plants.
Mammals: Eutamias,Neotoma,Microtus, Thomomys,Lepus.

Lepus californicus texianus

Type Locality: Unknown probably in western Texas.

General Char. Large, light gray jack rabbit with black upper surface of tail and black tips to ears. Coat fades to lighter gray with age. Meas. 606 T.L. 85 T. 133 H.F. 123 E. Wgt. 6-7 lbs.

Distribution: Both Upper & Lower Sonoran Zones of practically the whole State, west of and including a part of Pecos Valley. In south western portion of state, slight gradation to eremicus of Arizona deserts. Common in valleys and on slopes and mesas below 7,000-foot contour, among shrubs, rabbit brush. In part nocturnal, but active in morning and evening hours. During day lie concealed in forms under bushes and cactus plants and grass.

Sylvilagus auduboni neomexicanus

Type Locality: Fort Sumner, N.Mex.

General Char. Long-eared cottontail brownish on back.
Meas. T.L.374 T.49 H.F.87 E.N.55.

Distribution and Habitat: Plains country of Eastern N.Mex. most of Pecos Valley. Taken at Carlsbad and Eastern slope of Guadalupe Mts. It is common in Upper and Lower Sonoran. Grassy plains country below the border of junipers and nut pines, also mesquite and creosote valley bottoms along the Pecos. Live in open country, in prairie dog towns, or around other burrows that afford protection. Food green grass and herbaceous plants

Sciurus fremonti lychnuchus

Type Locality: White Mts, N. Mex. Forks of Ruidoso Creek, Lincoln Co.

General Char. Reddish gray, with black side stripes in summer, almost as red as eastern red squirrel.

Distribution and Habitat: Common in Canadian Zone in White, Capitan, Sacramento, and possibly Guadalupe Mts. Fairly open forest, Douglas spruce yellow pine and blue spruce are their accustomed habitat.

Eutamias cinereicollis canipes

Type Locality: Guadalupe Mountains, close to the Texas-New Mexico line, at 7,300 ft.

General Char. Gray collared, ashy neck and shoulders, broad black stripes, gray feet and tail.

Distribution and Habitat: Range thru Transition and Canadian, from 7,000 to 11,380 ft. common in spruce and fir forests, fond of rocky slopes and cliffs and caves. Note of alarm is a shrill rapid chipper, repeated several times, also have low chuck-chuck-chuck

Ammospermophilus interpres

Type Locality: El Paso, Texas.

General Char. Texas Antelope Squirrel has dark gray back, long tail, under surface of tail is light gray or whitish never pure white or gray. Meas. T.L. 225 T. 79 H.F. 38.

Distribution & Habitat: Foothills of Manzano, San Andres, Organ, Franklin Mountains in N. Mex. In Texas west base of Guadalupe and Franklin Mts. near El Paso. Restricted to the canyons and rocky foothills of the desert mountains, along the line between Upper & Lower Sonoran Zones.

Citellus grammurus grammurus

Type Locality: Purgatory River, Las Animas County, Arizona.

General Char. About size of Eastern Gray Squirrel, with long bushy tail shorter ears and coarser hair. Buffy gray in color with clear or silvery gray over shoulders. Back is coarsely scalloped or mottled with crescent-shaped spots or wavy cross lines. Lower parts are soiled whitish and the feet clear buffy.
Meas. T.L. 493 T.217 H.F. 58.

Distribution & Habitat: Rock Squirrels are abundant where rocks, cliffs, and canyons furnish homes. Not found on plains and wide valleys or mountains. Range is Upper Sonoran, although they may go over above and below. Found in rim-rock border of arid valleys, or sunny ledges of canyon wall. Great boulders at bases of steep slopes serve as watchtowers, cut-banks or steep earth walls are often inhabited. Extend over most of the mountains and canyon of the Guadalupe Mts.

Citellus spilosoma major

Type Locality: Albuquerque, N. Mex.

General Char. Largest spotted sperm-ophile, upperparts pale fulvous with large white dots scattered over the back, under parts white.
Meas. T.L. 234 T. 30 H.F. 30.

Distribution & Habitat: Range north along Rio Grande to Espanola, east to Santa Rosa, down Canadian River valley and south south down the Pecos River valley to Davis Mts. Texas. Mainly in Upper Sonoran Zone though not far up in it. Common over dry mesa top and along edges of valleys, where old burrows are common. Burrows are usually near busnes or tufts of weeds. Can be seen during morning and afternoon, but at mid-day disappear, not found in irrigated valleys or moist river valleys.

Citellus spilosoma canescens

Type Locality: Wilcox, Arizona.

General Char. About size of antelope squirrel or a large chipmunk. Closely and irregularly dotted over the back with white spots, which in unworn pelage usually show narrow posterior margins of black. Ears short, tail is slender and slightly spreading. The ground color of the upper parts is bright ochraceous, light russet brown or ashy gray. Underparts are white or soiled whitish. A few individuals are more grayish.
Meas. T.L.207 T.60.5 H.F.31.

Distribution & Habitat: Extend the lenght of the Rio Grande Valley in N.Mex. They are desert loving and are most abundant in the arid valleys. They use any opening that is convenient, burrows near mesquite, creosote and cactus plants, food seeds, sunflowe seeds are favorites, and green vegetation, nuts, and any berries at hand. Upper & Lower Sonoran Zones.

Citellus mexicanus parvidens

Type Locality: Fort Clark, Texas.

General Char. Largest of striped squirrels of New Mexico and Texas. Back Striped with nine well-defined parallel rows of whitish spots over dull brown; underparts creamy or soiled white; ears short, tail long and spreading.
Meas. T.L. 330 H.F. 43 T. 151.
Females some what smaller than males.

Distribution & Habitat: Rio Grande Ground Squirrel comes into N.Mex. along Pecos Valley, to Carlsbad and Roswell. Lower Sonoran , within the semi-arid division. Associated with mesquite in warm valleys. Burrows are at the base of mesquite bushes, the pods of this bush form their chief food, but feed also on seeds, grain, lizards, and insects.

Cynomys ludovicianus arizonensis

Type Locality: Point of Mountain, near Wilcox, Arizona.

General Char. Prairie Dogs, bif fat buffy brighter than C.l.ludovisianus short ears, legs and fairly short, black tipped tails.
Meas. T.L. 388; T.89; H.F.62.

Distribution & Habitat: Southern part of New Mexico west of the Pecos Valley, range mainly Upper Sonoran. Colonies may be found on the mesa tops among juniper and nut pine growth, more often on short grass slopes of the open valleys, even in regular desert environment, found on the plateua top and eastern slopes of the Guadalupe Mts. Country they inhabit it is characterized by cactus, mesquite, Spanish-bayonet, low grama and other grasses. Burrows in bare sections, have crater-like rims to prevent water from washing in.

Onychomys leucogaster articeps

Type Locality: Clapham, Union County New Mexico.

General Char. Grasshopper mouse is a plump little animal, with small ears and rather short, tapering tail Upper parts dull cinnamon buff, upper middle portion of the ear blackish; lower parts, feet, lower surface, and tip of tail pure white. Immature ones are pale slate gray above becoming darker gray as they reach maturity.
Meas. T.L.151; T.42; H.F. 21;

Distribution & Habitat: Found on the Upper Sonoran plains of eastern N.Mex. including the Pecos Valley. It is a mouse of the grassy and weedy plains country. Are caught in traps easily set in burrows, runways, open places, under weeds and wolfberry bushes, along gulches. They are nocturnal.

Onychomys leucogaster ruidosae

Type Locality: Ruidoso (Hales ranch) New Mexico.

General Char. Darker than articeps size about the same or slightly larger.
Meas. T.L.159; T.49; H.F. 22.2.

Distribution & Habitat: Ranges over the Upper Sonoran mesas and foothills of central and southwestern N. Mex. west into Arizona and south into Mex. Found among desert shrubs, sagebrush, greasebrush, and rabbit brush, also on sandy flats and even among the mesquite bushes and junipers. Probably found in the foothills of the Guadalupe Mts. Also easy to catch.

Onychomys torridus torridus

Type Locality: Camp Grant, Graham Co., Arizona.

General Char. A small and relatively long-tailed grasshopper mouse, bright cinnamon buff over the upper parts, under parts, feet, tip and lower side of tail pure white. In spring and summer the general color is slightly paler. Young are bluish or dull gray. Tail usually is more than half the lenghth of head and body. In leucogaster group it is less.
Meas. T.L. 149.5; T.51; H.F. 21; E.17.

Distribution & Habitat: Has a wide range in the Lower Sonoran valleys of southern N. Mex. Occupies the most arid desert valleys of the mesquite and creosote-bush area. Prefer sandy or mellow ground and are caught in traps set in burrows or trenches set with rolled oats.

Peromyscus maniculatus blandus

Type Locality: Escalon, Chihuahua, Mexico.

General Char. Little short-eared deer mouse, tail shorter than head and body. Upper parts buffy gray or dull ochraceous and young often very pale ashy gray. Tail sharply bicolored underparts white. Ears are covered with short silky hairs and usually with a minute tuft of white hairs at the anterior base.
Meas. T.L.145; T.61; H.F.21; E.14.9.

Distribution & Habitat: Inhabits mainly the Upper Sonoran Zone, below the mountain forest in the arid unforested desert ranges and open valleys, of southern N. Mex. Generally found in the mellow spots of open valley bottoms, often in open areas where vegetation is scarce. Grassy spots around springs are favorite spots, seldom found on rocky slopes and buttes. Rolled oats for bait.

Peromyscus leucopus tornillo

Type Locality: Rio Grande Valley, 5 miles above El Paso, Texas.

General Char. Medium sized with tail shorter than head and body. Ears small. Upper parts are dull grayish brown, underparts and feet, pure white. Tail indistinctly bicolored.
Meas. T.L.182; T.82.6; H.F.22.5; E.14.

Distribution & Habitat; Occupies the whole Lower Sonoran Zone of the Rio Grande, Pecos and Canadian River Valley in New Mex. It is a species of the open counrty and valleys, not often associated with rocks and cliffs. Found in weedy patches and bushes, among grasses of open valleys, along streams and irrigation ditches. Feed on seeds and beans of bushes and will eat oats and oatmeal in traps. Strictly nocturnal.

Peromyscus truei truei

Type Locality: Fort Wingate, N.Mex.

General Char. One of the large, long-tailed deer mice or cliff mice. Its ears are the largest of any other native mice and are thin and nearly naked. The tip of the tail in unusually haired, fur very long and soft; mustache long; eyes large and prominent. Sides are rich buff and the back slightly darker buffy brown. The feet and lower parts are pure white.
Meas. T.L.186; T.92; H.F.25; E.22.4.

Distribution & Habitat: Occupies all the Upper Sonoran Zone area of N.Mex. where there are rocks, cliffs, or canyons to furnish homes They are preeminently cliff dwellers and are rarely found far away from rocks, cliffs or walls. They forage in the nut pines and juniper trees for seeds. They are fond of rolled oats, barley, or almost any grain used in baiting traps.

Peromyscus boylei rowleyi

Type Locality: Noland Ranch, San Juan River, Utah, near the northwest corner of New Mexico.

General Char. One of the largest and longest tailed deer mice in N. Mex. Upper parts are dull brownish gray, lower parts and feet white.
Meas. T.L.191; T.99; H.F.21.6; E.17.2.

Distribution & habitat: Has practically the same range as truei covering all the rough country in the Upper Sonoran Zone and all the Zone except the open plains along the eastern edge of the State. They are partial to trees, rocks, cliffs, canyons, and rough hilly country. They are associated with juniper and nut pines, as well as blue oaks. Is often taken in brushy and weedy ground where as truei is not. Rocky cliffs are their favorite retreats, they do not often dig burrows. They are fond of rolled oats and almost any kind of grain or seed used as trap bait.

Peromyscus eremicus eremicus

Type Locality: Old Fort Yuma, Calif.

General Char. A medium-sized desert form, with long and very slender tail, medium-sized thinly haired ears and wholly naked soles of the hind feet. The sides are bright buffy ochraceous and the back buffy gray. The tail is indistinctly bicolor, being a little lighter below than above.
Meas. T.L.183; T.101; H.F.20.5; E.17.5

Distribution & Habitat: Inhabits the Pecos, Tularosa and Rio Grande Valleys of southern N.Mex. in the extreme arid Lower Sonoran area. They are rock and cliff dwellers and are rarely found in the open valleys far from rocks or the protecting walls of canyons or cut-banks. At Carlsbad they were taken in the rocks along the river just above the town. Found in cliffs and caves near abundant growth of desert shrubs and cactus.

Reithrodontomys megalotis megalotis

Type Locality: Janos, Chihuahua, and San Luis Spring, near border of Grant County, New Mexico. Probably Sonora.

General Char. Like small house mouse but has shorter and less tapering tail and deeply grooved upper incisors. Upper parts are a rich brownish gray, lower parts, feet, and lower half of tail, white.
Meas. T.L. 140; T. 71; H.F. 17.6; E. 12.5

Distribution & Habitat: The big-eared harvest mice occupy the Lower Sonoran valleys of all southern N. Mex. incl. the Pecos, Tularosa, Rio Grande, and Gila Valleys. They live under cover of grass, weeds, and such vegetation as serves for protection. They are generally caught in dry meadows or grassy or weedy borders of fields and roadsides where their narrow trail may be found under the grass. They may be caught by setting traps on bare spots under cover of grass, or in furrows along edges of fields or the spaces between growing grain. They are mainly seed eaters.

Sigmodon hispidus berlandieri

Type Locality: Rio Nazas, Coahuila, Mexico.

General Char. Cotton rat like brown rat but fur is coarser, full and soft in winter and thin and hispid in summer. The upper parts are buffy gray, the belly white, and the feet gray. The tail is thinly haired, tapering, light gray below, and blackish above.
Meas. T.L.256; T.113; H.F.32.5.

Distribution & Habitat: Extends up the Pecos River Valley to Carlsbad and Roswell, up the Tularosa Valley to Tularosa and up the Rio Grande Valley From El Paso to Socorro and westwards to near Deming. It fills the Lower Sonoran valleys wherever there is grass or vegetation for cover and food. Its range is along the river and stream valleys where bottom-land vegetation is plentiful. Found in grassy and weedy bottoms along the valleys. They feed on leaves stems and seeds of various plants. Alfalfa is a favorite food but they will eat any grain or oats as bait in traps or can be caught in traps set across runways.

Neotoma microbus canescens

Type Locality: North Beaver Creek, Beaver County, Oklahoma.

General Char. One of the largest and palest of the N.Mex. woodrats of the round tailed group. The upper parts are pale ashy gray; the lower parts and feet white, the white reaching to the skin on throat and breast; the tail, dark gray above and white below. Meas. T.L.330; T.137; H.F. 36.

Distribution & Habitat: Extends up Pecos and Rio Grande Valleys in N.Mex. It occupies mainly open Lower Sonoran Valleys, and its home is rarely associated with rocks or cliffs. They are abundant in the open arid valleys where cactus abounds and are found associated either with cactus or some of the thorny desert shrubs. Favorite site for a home is in the midst of a bed of large prickly-pears or thorny bushes, around the base of the cane cactus, Spanish-bayonets or in an allthorn. House in the open is conical 3 or 4 feet high in the shrubs is less regular. Food mainly cactus, also green vegetation, fruit and seeds. Houses are easily located.

Neotoma albigula albigula

Type Locality: Old Fort Lowell, Ariz.

General Char. Size medium for the round tailed wood-rats; upper parts brownish or buffy gray; lower parts white or occasionally buffy; throat and breast are pure white to base of fur; tail bicolor.
Meas. T.L.328; T.152; H.F.33.5; E.30.

Distribution & Habitat: Cover a large part of N.Mex. mainly in the Upper Sonoran Zone. Are found in rough country, and choose rocks and cliffs for their homes. They are great builders and pile up thorny rubbish over their homes so that they are very consoicuous. Cracks and narrow clefts in cliffs and rocks are favorites. They are usually nocturnal but are sometimes seen in the day time. Food vegetation, seeds, fruit, cactus pulp, and fruit, and nuts, acorns and walnuts. For trap bait they will take bread, bacon, meat, prunes, raisins, rolled oats, barley or any kind of grain or nuts.

Neotoma mexicana mexicana

Type Locality: Mountains near Chihuahua City, Mexico.

General Char. Medium-sized round tailed wood rat, about the white throated, albigula but more olive-gray upper parts and only the surface of the lower parts white, the base of the fur being plumbeous on throat and breast. Meas. T.L. 327; T. 149; H.F. 34.

Distribution & Habitat: Mexican wood rat barely reaches northward into southern N. Mex. on both sides of the Rio Grande Valley. Taken in the Guadalupe Mts. on the Texas-New Mexico line among the yellow pines in the Transition Zone. Live among the rocks and cliffs from the lower edge of the yellow pines up to the highest peaks thruout the Transition Zone. Build in seams in rocks filling with sticks and rubbish. Dense woods and chaparral furnish protection, taken from 5,500 feet to 8,000 feet. Food mainly acorns and sweet berries of the juniper.

Microtus mexicanus guadalupensis

Type Locality: Guadalupe Mountains, Texas, close to the New Mexico line at 7,500 feet.

General Char. Fairly small, short-tailed with short feet, upper parts dull umber brown, under parts buffy gray. Meas. T.L. 152; T. 54; H.F. 20.

Distribution & Habitat: Taken along the Guadlupe, Sacramento, White and Manzano Mountains, east of the Rio Grande Valley, mainly in the Transition Zone. In the Guadalupe Mts. in the upper parts of Dog Canyon and McKittrick Canyons they are common over the open slopes of the mountain, in brushy or grassy places from 7,500 to 8,500 feet. In the head of McKittrick Canyon they line in grassy parks and open places in the woods where their runways and burrows are abundant under grass and weeds. Found among rocks or stones under the shinnery oak and thru low basnes even into the edge of dry woods. Rooled oats, grain or meat form good food for bait.

Fiber zibethicus ripensis

Type Locality: Pecos River at Carlsbad New Mexico.

General Char. Size small for a muskrat. Colors pale dull brown in summer. Skull small and short with relatively large bullae.
Meas. T.L.470; T.202; H.F.67.

Distribution & Habitat: Pecos Muskrat is confined to the Pecos River and its tributairies. Live along grassy shores by still water; where they burrow in the banks. Live also along the irrigation ditches and some of the marshes occupied. Their burrows are below the water level, their nest chambers are a little above the water level with but one entrance. Trapping must be done with heavily weighted steel traps near deep water to ensure the muskrat drowning right away. Food consists of roots and tender parts of sedges grass and other plants growing near the streams and ditches.

Castor canadensis mexicanus

Type Locality: Ruidosa Creek, 6 miles below Ruidosa, New Mexico.

General Char. Size of candensis, upper parts dull rusty brown, belly clear drab or pale buffy gray, slightly darker in winter, paler in summer; young very similar to adults.
Meas. T.L.1,070; T.400; H.F.174.

Distribution & Habitat: Only a few beavers are left along the Pecos and Rio Grande Rivers and on some of the tributairies. In most cases they have been entirely trapped out. Houses of sticks and mud indicate their presence if they are to be found.

Thomomys fulvus fulvus

Type Locality: San Fransico Mountain, Arizona.

General Char. Medium-sized pocket gophers, dark, rich, rusty brown in color corresponding well with the color of the lava soil on which they are commonly found. The whole distribution of the species corresponds closely with the area of old lava flows in New Mexico and Arizona.
Meas. T.L.219; T.70; H.F.30.

Distribution & Habitat: Range lies mainly in the Transition Zone. They are abundant throughout the yellow pine forests where the grassy parks and openings are plowed and worked over by their numerous mounds and burrows. They are partial to mellow rich soil, and the vicinity of moist and fertile valleys, but are often found on stony mesas where the soil is so scarce that a burrow has to be abandoned and a new one started in better ground. They are great burrowers and seldom come above the surface feeding on roots of plant, tubers, bulbs cultivated plants are favorites, as are burdock, thistle, clover and alfalfa.

Thomomys baileyi

Type Locality: Sierra Blanca, Texas.

General Char. Small pale buffy-yellow gopher, typical desert forms.
Skull short wide cranium and very protruding incisors.
Meas. T.L. 212; T. 69; H.F. 29.

Distribution & Habitat: An Upper Sonoran form known only from two localities Sierra Blanca, and Tularosa. Occupies the open mesa country. They are fond of alfalfa and other garden vegetation.

Cratogeomys castanops

Type Locality: Bents Fort (Las Animas) Colorado.

General Char. Size large; colors dull yellowish brown above, slightly lighter below; skull broad and heavy. each upper incisor with a single middle groove.
Meas. T.L. 455; T. 75; H.F. 37.

Distribution & Habitat: Occupy all the Lower Sonoran valleys of New Mexico east of the Rio Grande and extend in a few valleys up the edge of the Upper Sonoran. They are partial to the mellow rich soil of the valleys and are abundant in the Pecos, parts of the Rio Grande and the Tularosa Valley Big mounds indicate their presence in valleys and side streams which furnish moisture and fertility. They feed mostly on roots, clover being a favorite, as well as alfalfa. They are easily trapped and do considerable damage in cultivated sections.

Geomys arenarius

Type Locality: Collected at El Paso, Texas.

General Char. Size Medium; tail rather long for a pocket gopher; colors pale buffy brown above; lower parts pale buffy or whitish, in many with irregular patches of pure white over throat, breast and belly. Upper incisors with deep middle and shallow inner groove down the front of each. Meas. T.L.258; T.88; H.F.33.

Distribution & Habitat: The pale sand-colored desert pocket gopher inhabits the Rio Grande Valley from El Paso north to Las Cruces and farther and west to Deming. Also taken at Monahans Texas, following the sand dune area into southeastern N.Mex. Found in sandy valleys and meadows, in gardens, alfalfa field, along ditches and in orchards. Their burrows are thrown up at short intervals and are quite large. They are as easily trapped as poisoned.

Dipodomys spectabilis spectabilis

Type Locality: Dos Cabezos, Arizona.

General Char. One of the largest and most spectacular of the 4-toed kangaroo rats; body short and compact; hind legs and feet long and powerful; front legs and feet small and weak; tail very long and slender with long brush at tip; head short and broad; eyes prominent, owl-like, appearing black but really with dark-brown irises; vibrissae long and full; external cheek pouches ample, fur lined and used for carrying food and stores; a small external gland concealed by fur on top of shoulders. Upper parts clear dark buff with dusky band across top of nose; tail gray along top and bottom becoming black all around toward end and with abrupt white tip 1 or 2 in. long, white base and broad white stripe along each side to beyond middle; lower parts, feet, band across hips and spots over eyes and back of ears white.
Meas. T.L.350; T.211; H.F.52.

Distribution & Habitat: Occupies most of the upper division of Lower Sonoran Zone and the Lower edge of the Upper, from Tucson, Ariz., east to the western edge of the Rio Grande Valley in N. Mex. Prefer the dry hard soil of the barren mesa tops and foothill slopes of the desert ranges. Mounds are scattered. Nocturnal in habits, mounds 12 feet in extent 18 in. high. Food seeds neatly shelled, rolled oats will serve as bait.

Dipodomys spectabilis baileyi

Type Locality: From 40 miles northwest of Roswell, New Mexico.
Gen. Char.
Size larger than spectabilis and color slightly paler, with stronger contrast of black markings; skull more massive with more expanded zygomatic arches.
Meas. T.L. 285; T. 233; H.F. 53.

Distribution & Habitat: Occupies most of the Upper Sonoran Zone of New Mex. and northwestern Texas in the open plains country below the level of the nut pines and junipers, and in places come slightly into the upper edge of Lower Sonoran valleys. Common around Carlsbad to the foot of the Guadalupe Mts. and up 5,000 feet to the extreme upper limit of the lower Sonoran. Mounds are large with open or closed holes in the sides, size 3 feet high and 8 feet wide. They prefer firm solid soil for their homes. The open mesa tops with short grass and scattered vegetation is dotted with mounds. Trails lead away, paired tracks of hind feet show in sandy dusty spots. Not easy to get with rolled oats but the seeds of the little wild sunflower are their favorite food.

Dipodomys merriami merriami

Type Locality: New River, Arizona.

General Char. Dull-colored, four-toed, smallest of the N. Mex. kangaroo rats. Meas. T.L.248; T.150; H.F.38; E.14.

Distribution & Habitat: Occupies the whole Lower Sonoran area of southern Arizona and New Mexico and extends into Mexico and western Texas. Is found with Dipodomys ordii in N. Mex., the five-toed form. They do not extend up into the mountains, but may be found wherever the mesquite grows and the soil is sufficiently mellow for their burrows. They are most abundant in the sandy and mellow soil soil of the desert valleys. Burrows are closed during the day, usually under the edges of busnes or cactus, mesquite or creosote. Food mainly seeds, of creosote mesquite, pursiane, grama grass.

Dipodomys ordii ordii

Type Locality: El Paso, Texas.

General Char. Smallest of the five-toed kangaroo rats. in N. Mex. Color as in merriami only distinguished by number of toes as they live together. Meas. T.L. 240; T. 134; H.F. 38.

Distribution & Habitat: Inhabits the Lower Sonora valleys of southern N. Mex. north as far as Carlsbad up the Pecos, Socorro, up the Rio Grande. Found among the sand hills where the hillsides afford opportunity to dig their horizontal burrows. Also common on hard and stony ground of the mesas. Prefer the mellow sands of dunes and valley borders. The burrows may enter the ground under the edge of cactus or low busnes, or lie in the open. Burrows are large and earth thrown up at distance from opening. Runways extend from opening to feeding grounds. Food consists of seeds of desert plant life. Sunflower seeds are favorites. Can be trapped with rolled oats.

Perognathus flavus flavus

Type Locality: El Paso, Texas.

General Char. A small, smooth-furred, yellow mouse with short, rounded ears, and rather short, smooth tail. Upper parts rich pinkish buff clouded with dusky; spot back of the ear and a band along the side clear buffy; under parts white.
Meas. T.L.112; T.50; H.F.15.8.

Distiburion & Habitat: Smallest rodents in America, is abundant in N.Mex. covering the valley country in Upper and Lower Sonoran Zones. It is partial to mellow soil of the valley bottoms, where it lives among the scattered weeds and bushes and burrows in the soil. Found near mesquite bushes, sunflower and other seed laden plants. Common on sandy bottoms below El Paso. Burrows in groups of three or four around the edge of desert brush. Food shelled seeds, especially sunflower, but at times will eat rolled oats.

Perognathus merriami gilvus

Type Locality: Collected at Eddy, now Carlsbad, Eddy County, N. Mex.

General Char. Sleek, little yellow mouse, with white belly, short rounded ears, and short smooth tail, is slightly larger than flavus which it resembles but is distinct, occuring at same place Meas. T.L. 122; T. 60; H.F. 16.5.

Distribution & Habitat: Most of the range lies in Western Texas, within Lower Sonoran Zone. Found at Carlsbad in the low stony mesas. Found among the low mesquite bushes at the edge of the valley, on stony or hard ground. Not much known of food but seeds of various plants, rolled oats will probably serve for bait.

Perognathus hispidus paradoxus

Type Locality: Banner, Largo County, Kansas.

General Char. A large stout pocket mouse with harsh fur and rather long but not bushy tail. Upperparts are grizzled buff with clear buffy stripes along sides, and the underparts are white.
Maas. T.L.222; T.108; H.F.26.5.

Distribution & Habitat: Plains species covering the Pecos Valley and eastern N.Mex. Most of its range lies in Upper Sonoran but extends in the Lower Burrow in open plains country with regard to shelter even where there is low shrubby desert growth they make their small perpendicular burrows in the open. They will follow a long mark simulating a runway and can be trapped in this track with rolled oats.

Perognathus penicillatus eremicus

Type Locality: Fort Hancock, El Paso County, Texas.

General Char. Large pocket mouse, long tufted tail and pointed ears, rather harsh buffy-gray fur, lower parts clear salmon buff. Distinguished from intermedius by having pink instead of dusky soles of the hind feet.
Meas. T.L.176; T.98; H.F.22.

Distribution & Habitat: Brush-tailed pocket mouse is a Lower Sonoran form extending into M.Mex. from the south. Common at El Paso, probably occupies the southern part of the Pecos Valley. Occupies sandy desert valleys where bushes and small plants afford protection. Burrows found under the creosote bushes. Hard to trap, very few records for the state. They may be caught at any time of day by putting the traps inside of burrows and leaving them open. They are eager for rolled oats.

Canis latrans texensis

Type Locality: Corpus Christi, Texas.

General Char. Rather large dark form, fairly heavy clouding of black-tipped hairs over the back, tail and on the front legs.
Meas. T.L.1,143; T.355; H.F.180.

Distribution & Habitat: Occupies the mesquite and juniper country of middle and western Texas and southern and central New Mexico. Found in both Lower and Upper Sonoran Zones. They adapt themselves to every kind of environment from the open plains and and valleys to brushy and mesquite covered slopes and into the rough foothill country of juniper and nut pine and even in the yellow-pine timber of the mountian plateaus. In the daytime they usually hide in gulches or under brush but if food has been scarce they will travel abroad even in the daytime. They are particularly fond of sheep and goat meat, and all kinds of native meat. They always gather where food is abundant.

Canis mearnsi

Type Locality: Quitobaquita, Pima County, Arizona.

General Char. One of the smallest of our coyotes, with especially light dnetition and bright, rich coloration. Meas. T.L.1,000; T.300; H.F.190.

Distribution & Habitat: Range across the Lower Sonoran valleys of New Mexico taken at Salt Valley at the west base of the Guadalupe Mountains, and from near EL Paso, Texas. It is not abundant where its range is overlapped by the larger texensis.

Mephitis mesomelas varians

Type Locality: Texas.

General Char. Size rather large, tail very long, and normally the two white stripes on the back rather narrow. Meas. T.L.758; T.293; H.F.71.

Distribution & Habitat: Range of the long tailed Texas skunk covers more than the eastern half of N.Mex. mainly in the Upper and Lower Sonoran. The species is fairly common over the whole of this area. Brushy and weedy bottoms along streams, gulches, and canyons are favorite situations. Their peculiar little plantigrade tracks are conspicuous along roads and trails and wherever there was rich soil the little holes where they dig grubs and beetles dot the ground. Their food is for the most part insects. When properly killed they will have no offensive odor. By shooting thru the spinal column back of the shoulders or breaking its back with a blow of a club, the posterior muscles are paralized and the scent glands can not be discharged.

Spilogale leucoparia

Type Locality: Mason, Texas.

General Char. Much striped and spotted, and light, slender, active little animals. Usually four narrow white stripes along the front half of the back, while the rump is variously spotted with white and usually the terminal half or quarter of the tail is white, Body color black. Skulls high and narrow, with swollen mastoid capsules.
Meas. T.L.402; T.145; H.F.47.7.

Distribution & Habitat: The Rio Grande spotted skunk is mainly a Texas and eastern N.Mex. species, along the Pecos valley. Food: farm stock and rabbits.

Taxidea taxus berlandieri

Type Locality: Llano Estacado, Texas.

General Char. Sturdy little animal short and wide, with short tail and legs and very long front claws. The body hair is long and coarse and of a yellowish-gray color, while that of the feet, nose and face is black. The cheeks are marked with white, and a white stripe extends from the nose over the crown to the shoulders or sometimes along the center of the back to the base of the tail.
Meas. T.L.730; T.120; H.F.120.

Distribution & Habitat: Generally distributed over the whole of N. Mex. Their numbers are greatest where prairie dogs and ground squirrels abound. They are hunters and their prey is almost entirely the burrowing rodents. They leave mounds of earth where they have dug out a burrow. Their large burrows are usually conspicuous enough to indicate their presence.

Procyon lotor mexicanus

Type Locality: Espea, Sonora, Mexico.

General Char. Size of small bear, gray with pointed nose, black mask, bushy tail encircled by five or six black rings, and large plantigrade feet with naked soles. Decidedly paler than the eastern form.
Meas. T.L. 865; T. 300; H.F. 135.

Distribution & Habitat: Raccoons are common along most every permanent stream in N. Mex. up to the border of the Canadian Zone. They are not often found far from water. Most abundant along the immediate valleys of the Pecos, Rio Grande, and Gila Rivers. They depend upon cliffs and broken rocks for cover and dens, and where canyon walls supply protection, and streams, food they are common. Any kind of meat attracts them to traps. They are fond of corn, berries, mussels, watermelons and nuts.

Tadarida Mexicana

Type Locality: Ameca, Jalisco, Mexico.

General Char. Size medium with short wide ears joined at base over nose, and naked tail extending about three-fourths of an inch beyond membranes; fur short and velvety, sooty or dull blackish.
Meas. Forearm 40-45; ext. 12 in.

Distribution & Habitat: Found in the Lower Sonoran area in the Pecos, and Rio Grande, and probably the Gila Valleys. Have been taken at El Paso, and Carlsbad in old buildings and in vast numbers in the Carlsbad Caves. They are mainly cave dwellers but seem to be abundant in towns and settlements and occupy cracks and open spaces in old houses and buildings. They emit a strong musky odor. They occupy caves and clefts in rocks.

Antrozous pallidus pallidus

Type Locality: El Paso, Texas.

General Char. Fairly large, pale large eared bat. Pale-buffy fur, and light brownish wings. Long ears extend forward about an inch. Skull only two upper incisors and only 28 teeth.
Meas. Forearm 50. Entire spread of wings more than a foot.

Distribution & Habitat: Occupies al the lower Sonoran area and in places extends slightly into the Upper. They inhabit the hottest deserts but spend the day in caves or cracks in the cliffs, hollow trees, or dark places in buildings. They come out of their roosts early in the evening.

Corynorhinus macrotis pallescens

Type Locality: Keam Canyon, Navajo County, Arizona.

General Char. Size large, with ears over an inch long; upper incisors, four; fur light drab gray; ears and membranes slightly darker. The only other long eared bat besides Antrozous pallidus in N. Mex. Meas. Forearm 44. Spread of wings 12in.

Distribution & Habitat: Only a few records for N. Mex. McKittrick Canyon, 20 miles west of Carlsbad, and cliff dwellings on Mule Creek. Probably ranges over the Lower and Upper Sonoran Zones. It is a cave and cliff dweller and can be found hanging from the walls of caves or mine shafts.

Euderma maculatum

Type Locality: Piru, Ventura County, California.
General Char. A rather large bat with very large ears, fur black with three large white spots on back and underparts washed with white.
Meas. T.L. 110; T. 50; H.F. 9; F.A. 50; E. 34.

Distribution & Habitat : Only four known records for this spotted bat. One was taken in Mesilla Park, N. Mex.

Eptesicus fuscus fuscus

Type Locality: Philadelphia, Pa.

General Char. Size rather large, ears small, fur bright hazel-brown; ears and membranes naked, black.
Meas. T.L. 119; T. 50; H.F. 11; F.A. 45;
Spread of wings about 13 in.

Distibution & Habitat: One of the most abundant bats over the higher parts of N.Mex. mainly Transition Zone They are found in the yellow-pine forests all summer. They were found in Slaughter Canyon, Guadalupe Mts. in Carlsbad Cave. They are often found during the day under loose pieces of bark on dead trees, also found in houses, barns, and outbuildings, where they occupy open spaces. They have a very steady flight. But do not come out till fairly dark.

Pipistrellus hesperus hesperus

Type Locality: Fort Yuma, California.

General Char. A tiny bat, Pigmy or Little Canyon Bat, gray in color, with very small ears; fur pale buffy gray, naked ears and membranes black. Meas. T.L. 75; T. 30; H.F. 7; F.A. 30; Spread of wings 8in.

Distribution & Habitat: Occupy the whole Lower Sonoran Zone of N. Mex., wherever there are cliffs, or canyons. They are rarely found far from the canyon walls. They have been taken in the Guadalupe Mts., Carlsbad, and Carlsbad cave. Their flight is extremely quick, with short abrupt turns.

Myotis velifer incautus

Type Locality: San Antonia, Texas.

General Char. A fairly large form of Myotis fur dull brownish; ears and membranes dark brown or blackish. Meas. T.L.93; T.41; H.F.9; E.12; F.A.42;

Distribution & habitat: House Bats have been taken at Carlsbad, N. Mex. They have been located in limestone caves not far from Carlsbad. Some have been taken in McKittrick Canyon 20 miles west of Carlsbad.

Myotis thysanodes thysanodes

Type Locality: Old Fort Tejon, Kern County, California.

General Char. One of the largest of the genus Myotis, with moderately large ears reaching slightly beyond tip of nose, and with hairy margin of tail membrane; fur dull yellowish brown ears and membranes dusky.
Meas. T.L.87; T.37; H.F.9; E.15; F.A.42

Distribution & Habitat: There are specimen from Carlsbad Cave, etc. They occupy mainly the Lower Sonoran Zone. The fringed bats seem to be mainly colonial in habits, and especially partial to caves and old buildings.

Myotis californicus californisus

Type Locality: California.

General Characters. A very small bat with a spread of wings only about 5 inches, with small ears, bright-tawny or hazel-brown fur, and blackish ears and membranes.
Meas. T.L.77; T.37; H.F.6; E.11; F.A.32.

Distribution & Habitat: They are found over most of the Lower Sonoran Zone area of N.Mex. Taken in Carlsbad Cave. Found in caves, canyons, and houses.

Myotis subulatus melanorhinus

Type Locality: Little Spring, north base of San Fransisco Mountains, Ariz.

General Char. Size small with small ears, sooty-black nose and face, light buffy brown back and pale buffy belly. Meas. T.L.81; T.39; H.F.6.5; E.12. F.A.33.

Distribution & Habitat: Common in the arid region over most of N. Mex. Taken in Guadalupe Canyon, some canyon on the east slope of the Guadalupe Mts. near the New Mexico and Texas line. They fly among trees and in towns or settlements. Like most bats they seek water when they first emerge from their roosts.

Ethylene dichloride (75 per cent) and Carbon tetrachloride (25 per cent)

mixture.

Carbide and Carbon Chemicals Corportaion
20 East 42nd Street,
New York City,N.Y.

(govt price about 70 cents
per gallon)

Field Notes.

1. Mus musculus musculus ♀
Aug.7,1934 Pa.4 miles W.of Pottstown,(Rubers)
154-75-13-12.5cr.-13n. First Skin.

2. Sylvilagus floridanus mallurus Juv.♂
Aug.8.1934 Pa. Glenside,Phila.
Caught by dog. Skull crushed.
145-14-33-22cr.-18n.

3. Marmota monax ♀
Sept.4,1934 Pa.2 miles East of Warwick,Chester Co. Coll.J.Kendell.
542-139-85-28cr.-32n.

4. Peromyscus maniculatus gracilis
Sept.13,1934 New Hampshire, Juv.♂
Randolph, ¼ mi. West of Mt. Crescent House. 148.5-77-20-19cr-32n.

5. Peromyscus maniculatus gracilis ♀
Sept.13,1934 New Hampshire, same
182-82-20-16cr-18n.

6. Erethizon dorsatum dorsatum Juv.♀
Sept.14,1934 New Hampshire,same
554-145-85-25cr-30n. Skull broken.

7. Tamias striatus lysteri ♀
Sept.16,1934 New Hampshire,same
240-93-35-15cr-15n.

8. Napaeozapus insignis insignis ♂
Sept.19,1934 New Hampshire,same
234-150-32-12cr-14n. White tip of tail 19mm. Tail damaged.

9. Sciurus carolinensis leucotis ♀
Oct.16,1934 Pa. Valley Forge.
495-207-67-25cr-34n. Found dead on road.Skull crushed.

For Kuroda

1. Scalopus a. aquaticus ♀ March 24 '35
Penn. 1½ mi. S.W. of Cedarville, Chester
Co. N. Coventry Twp.
156-22-19 Skull perfect

2. Microtus p. pennsylvanicus ♂ March 24
Penn. 1½ mi. S.W. of Cedarville Chester Co.
N. Coventry Twp. Teste enlarged.
162-43-21.5-14cr. 12 n.
Skull - imperfect.

3. Microtus p. penn. ♀ March 31
Penn. 1½ mi. S.W. of Cedarville Chester
Co. N. Coventry Twp.
140-35-18.5-8cr.-11n.
Skull perfect

4. Perimyscus l. novaboracensis ♂ March 31
Penn. 1½ mi. S.W. of Cedarville Chester
Co. N. Coventry Twp.
147-69-20.5-15.5cr.-16n
Skull perfect.

5. Scalopus a. aquaticus ♀ April 30.
Penn. Villa Nova, 12 mi. S.W. of Phila.
143-21-19 Skull perfect
H. R. Roberts

6. Microtus p. penn. ♀ Feb. 24, 1935
Penn. Villa Nova, 12 mi. S.W. of Phila.
136-41-21-18cr.-20n.
H. R. Roberts

6. Sorex c. carolinensis ♂ Nov. 1. '34
Penn. Near Reading, Berks Co. [illegible]
473 - 220 - 64 - 21 cr. - 32 n.
Skull perfect

7. Microtus p. pennsylvanicus ♀ May 12, '35
Penn. 1½ mi. S.W. of Cedarville, Chester Co.
N. Coventry Twp.
160 - 44.5 - 20 - 10 cr. - 11.5 n.

8. Sorex c. cinereus ♂ May 27. '35
Penn. 1½ mi. S.W. of Cedarville, Chester Co.
N. Coventry Twp.
79 - 29 - 10 - 2.5 cr. Skull perfect

9. Mus. m. musculus ♀ May 27. '35
Penn. Same.
142 - 80 - 18.5 - 10 cr. - 13 n.
Skull perfect

11. Microtus p. pennsylvanicus ♀ May 27.
Penn. Same. 10. embryos.
170 - 44 - 21 - 10.5 cr. - 12 n.

12. Sylvilagus — Juv. ♀ May 26.
Penn. Villa Nova, 12 mi. S.W. of Phila.
160 - 8 - 42 - 34 cr. - 27 n.
H. R. Roberts.

10. Microtus p. penn. ♀ May 27. '35
Penn. 1½ mi. S.W. of Cedarville, Chester
N. Coventry Twp. 6. embryos.
156 - 36 - 21 - 10 cr. - 11 n.

#3 Marmota Oct 7 Aug 7.[illegible]

Pence N. Side Mill, Dyberry Pump.
Wayne Co.

Windy, chilly, no sunshine little
rain, shot nothing on burrowed
mound. 3:45 P.M.

590-145-91-24-36
Shot by J. G. Schnelling.
Folsom, Del Co Pa.

Measurements

1. [illegible] ♀ July 8. 1935
Texas, South of Signal Peak 4400 ft.
Culberson Co.
[illegible]
595 — 71 133 — 120 . 152

2. [illegible] ♂ July 11 1935
[illegible] Loc.
393 mm. 35. 8 — 79 cr. 6 —
[illegible]

3. [illegible] ♀ July 12. 1935
[illegible] Loc.
494. 70 - 124 166 127
[illegible]

4. [illegible] ♀ July [illegible]
Texas, South of [illegible]
Guadalupe [illegible]
13.5 [illegible] 1.25 - [illegible]
342 31 52 72 76

5. [illegible] ♀ July 17 1935
Texas, South of Signal Peak, [illegible]
Culberson Co.
[illegible]

6. Prarie Dog. ♀ July 27, 1935
Texas Foot of Pine Canyon 5740 ft.
Culberson Co.
381 - 75 - 60 - 18 cr - 11 n.

7. Prarie Dog - ♀ Aug 2, 1935
Texas. Foot of Pine Canyon - 5740'
Culberson Co.
354 - H.F. 58 - T. 65 - 13 N - 6 Cr.

8. Pack Rat - Im. ♀ Aug 6, 1935.
Texas.
Culberson 3 Mi. ENE of Frijole - 5100 ft.
3

9. Pack Rat ♀ Aug 7, 1935
Texas Culberson Co. 3 Mi ENE of Frijole 5100 ft.
340 - 152 - 35 - N 28 - Cr 22.

10. Grasshopper Mouse - ♀ Aug 7, 1935
Texas Culberson Co. Foot of Pine Canyon 5740 ft.
156 - 51 - 19 - 17 N - 18 Cr.

11. Prarie Dog - ♀ Aug 7, 1935.
Texas Culberson Co. Foot of Pine Canyon 5740 ft.
264 - 62 - 58 - 10 N. - 8 Cr.

12. Spiny Pocket Mouse - ♂ Aug 8, 1935.
Texas Culberson Co. Foot of Pine Canyon 5740 ft.
110 - 57 - 17. Ears eaten by [illegible]

13. Grasshopper Mouse. ♀ Aug 9, 1935
Texas, Culberson Co. - Foot of Pine Canyon - 5740 ft.
147 — 56 — 20 — 16 Gr — 17 N.

14. Ground Squirrel ♀ Aug 9, 1935.
Texas, Culberson Co. Foot of Pine Canyon 5740 ft.
226 — 74 — 44 — Gr 6 — 9 N.

15. Kangaroo Rat. ♂ — Aug 9, 1935.
Texas, Culberson Co. Foot of Pine Canyon 5740 ft.
230 — 131 — 38 — Gr 11½ — 18 N.

16. Gopher. ♀ — Aug 9, 1935.
Texas Culberson Co - Foot of Pine Canyon 5740 ft.
[illegible] — 70 — 33 — N — [illegible] Gr.

17 Grasshopper Mouse ♂ Aug 10, 1935
Texas Culberson Co - Foot of Pine Canyon 5740 ft.
135 — 45 — 20 — 17 N — 17 Gr.

18. Peromyscus — Juv ♂ Aug. 11, 1935
Texas, Culberson Co - Foot of Pine Canyon 5740
158 — 70 — 21 — 15 N — 16 Gr.

19. Gopher ♀ Aug 11, 1935.
Texas, Culberson Co - Foot of Pine Canyon 5740
248 — 75 — 46 — 6 N — 4 Gr.

20. Gopher. Juv ♂ — Aug 11, 1935. 5740
Texas Culberson Co. Foot of Pine Canyon
213 - 62 — 30 — 3 Cr — 5 N.

21. Gopher Juv ♂ — Aug 11, 1935. 5740.
Texas. Culberson Co. Foot of Pine Canyon
212 — 65 — 30 — 4.5 Cr — 5 N.

22. Spiney Pocket Mouse - ♂ Aug 12, 1935 5740.
Texas. Culberson Co. Foot of Pine Canyon

23. Badger — ♂ Aug 12, 1935.
Texas. Hudspeth Co. Salt Flat Route #62
714 — 140 — 110 — 52 N — 33 Cr.

24. Gopher (Jacob) — ♂ Aug 13, 1935. 5740
Texas. Culberson Co — Foot of Pine Canyon
247 — 72 32 5 N — 4 Cr.
(kept alive four days)

25 - Cotton Tail — ♂ Aug 21, 1935. 4750 -
Texas Culberson Co — 6 MIENE of Fryole
332 — 30 76 65 N — 84 Cr.

26 - Sadabida mexicana - ♂ Aug 27
New Mexico - Carlsbad Caverns
86 - 33 - 10 - 12 cr 16 n - 4 tips - 284 ext.

27 - S. mexicana ♂ Aug. 27
New Mex, Carlsbad Caverns
89 - 30 - 9 - 13½ cr - 16 n - 8 tips - 278 ext

#28. S. mexicana ♀ Aug. 27
New Mex., Carlsbad Caverns
90 - 34 - 8 - 13½ cr - 16 n. - 6 trag - 289 ext.

29. S. mexicana ♀ Aug. 27
Same loc.
89 - 33 - 8 - 12 cr - 16½ n - 5 tra - 279 ext.

30 S. mexicana ♂ - Aug. 27
Same loc.
87 - 32 - 8 - 13 cr - 16 n - 5 tra - 295 ext.

31. S. mexicana ♂ Aug 27
Same loc.
86 - 30 - 7 - 12 cr - 15½ n - 5½ tra - 288 ext.

32 S. mexicana ♂ Aug. 27.
Same loc.
87 - 30 - 8 - 12 cr - 16 n 5½ tra - 293 ext.

33. S. mexicana ♀ Aug. 27
Same loc.
70 - 31 - 8 - 13 cr - 16½ n - 5 tra - 296 ext.

EQUIPMENT

For trapping
8 Schuyler Rat Traps
7 Gopher traps
2 Government rat traps
16 Government mouse traps
7 Schuyler mouse traps
3 Steel traps
8 Live traps

Wire 9 sizes
Arsenic
Cotton
Red Cloth
Skinning tools
Dowls
Saw dust
Pins
1 landing net — too small
3 boxes of towels
1 roll of toilet paper

1 photo flash light
4 #935 batteries
6 #950 batteries
1 Coleman lantern
7 generators — too many
16 mantles
1 sheath knife
1 pair pliers
1 Scout knife
1 hatchet — not needed
1 flash light
2 Respirators
1 package of filters
1 Thermo jug
1 folding table
2 folding chairs — essential

✓1 blanket roll with 8 blankets
✓4 bath towels
✓4 hand towels
✓4 wash cloths
1 iron
✓3 boxes of cartridges(150)
✓1 36 in. rule
✓1-12 in. rule
✓2 pads
✓1 pkge of paper.
✓1 box of pencils.
✓1 tar tape.

The Ground Sloth.

Nothrotherium shastense

Measurements: 8ft. 11in. long, 3ft. 1in. height, hips 27in.

Walked entirely on the outer margin of hind feet-normal sole vertical. Feet had pads. Claws turned inward, were clear of ground. Weight born on knuckles of front feet, tips of claws clear. Fore limbs longer and slenderer than the hind with more freedom of motion. Claws powerful for tearing, defense or digging. Ossicle in spout-like symphysis of lower jaw, opposing horny pad above. Had prehensile tongue. No sign of dermal armature. Hair-yellow, coarse, straight, 45mm. l. Algae on the hair gave green tinge. Dung- rounded mass of plant remains, 5cm. in diameter, one side flattened, other conical. Remains woody, quartz sand, small stems and pieces of roots, seeds, and fruit.

Skull.

Shape; elongate, subcylindrical, slight sagital crest. Lachrymal present, canal large. Malar vertically expanded with inferior process slender, lies between it and squamosal, which has long slender process. Frontal: marked depression above the almost obsolete post-orbital processes, has large sinus. Pterygoid: with large posterior sinus opening inward. Lower Jaw: slender, spout-like predental region and symphyseal ossicle. Dentition: $\frac{4}{3}\frac{4}{3}$ anterior caniniform teeth absent.

Scapula small. Manus with metacarpals longer and slenderer, pollex and digit V reduced, all digits bear functional claws

Ungual phalanx digit II manus, broad with convex dorsal surface. Wing-like process of calcaneum long. Astragalus modified for rotation of foot to outer side. Hallux reduced. Digit V in pes vestigial.

From:

Lull, R.S. Mem. Peabody Mus. Nat. Hist. New Haven 43 pt. 2 1929 pp.1-[illegible].

LIST OF BONES FROM WILLIAM'S CAVE

1. Horse-- Fragment of upper jaw with 4 teeth, fragments of bone with it.
   Loc. Close to north wall at bottom of unburnt dung layer; 6ft. down and 3ft. forward of midpoint F.

2. Deer-- Lower jaw, left side, with parts of three teeth in position. Burnt.
   Loc. Found in ashes 2in. down, 2½ft. from wall and 3ft. down from red mark, (Mr. Howard).

3. Horse?- Tooth and part of lower jaw.
   Loc. Same position as #2.

4. Leg bone
   Loc. In pine needles and rat dung above large white rock. 3½ft. back of and 5ft. below Datum Point, 4ft. from north wall.

5. Piece of leg bone?
   Loc. Rat dung layer 4ft. down, 16in. from N. wall 1ft. from Red Mark H.

6. Piece of leg bone?
   Same Loc.

7. Piece of Pelvis
   Same Loc.

8. Part of leg bone.
   Same Loc.

9. Piece of bone worm eaten.
   Same loc.

10. Vertebra
    Same Loc.

11. Piece of hoof.
Loc. Rat dung layer. 4ft. down and 1ft from Red Mark (H)

12. Piece of Horn
Same Loc.

13. Ring of Hoof? on a Stick.
Same Loc.

14. Piece of Leg Bone
Loc. In layer of needles and sticks, 5ft.5in. down 1ft. from Red Mark (H) 2ft from wall N.

15. ~~Tooth.~~ Unworn.
Loc. 7½ft. back of, and 5ft down from Datum Point, 4ft 5in. from N.wall.

16. Left Lower Ramus. ~~Cat?~~
Loc. In rat dung layer on surface. at Datum Point.

17. Foot bone.
Loc. Rat dung layer 4ft. down and 2ft from Red Mark (H)

18. Large Leg Bone
~~S~~outh Dung Layer Mid Point N.wall 9ft. down from D.P. 2ft from N.wall.

19. Leg Bone
Same Loc.

20. Piece of Heavy Bone
Same Loc.

21. Piece of tooth. (2)
Loc. Rat Dung Layer. 4ft. down and 2ft from N.wall in line with D.P.

22. Large Leg Bone.
Loc. Sloth Layer Mid Point N.wall 9ft. down from D.P. 2ft from N.wall.
Ass. with pieces of skin and hair, pine needles and pine cone.

23. Jaw, left and right ramus Deer
Loc. South section 5ft.6in. back of, and from surface to 2ft. down from D.P.

24. Dorsal Vertebra.
Same Loc.

25. Sacral Vertebra ?
Same Loc.

26. Cervical Vertebra
Same Loc.

27. Broken Vertebra.
Same Loc.

28. Broken Vertebra
Same Loc.

29. Small Vertebra.
Same Loc.

30. 2 pieces of Skull
Same Loc.

31. Piece of Skull.
Same Loc.

32. Small fragment of Skull
Same Loc.

33. Fragment of Upper Jaw with 3 teeth ~~Deer~~
Same Loc.

34. Fragent of Jaw with portion of tooth
Same Loc.

35. Fragment of tooth.
Loc. South section 5ft.6in back of, and from surface to 2ft. down from D.P.

36. Portion of Scapula.
Same Loc.

37. Portion of Leg Bone.
Same Loc.

38. Pelvis
Same Loc.

39. Broken Scapula.
Same Loc.

40. Fragment of Scapula.
Same Loc.

41. End of ~~Leg~~ Bone
Same Loc.

42. End of ~~Leg~~ Bone
Same Loc.

43. Left Femur.
Same Loc.

44. Left Femur.
Same Loc.

45. Right Femur.
Same Loc.

46. 2 Fragment of Skull.
Same Loc.

47. End of Ulna.
Same Loc.

48. Portion of Skull
Same Loc.

49. Fragment of Lower Left Ramus with one tooth. ~~Beer?~~
Loc. South Section 5ft.6in. back of, and from surface to 2ft. down from D.P.

50. Portion of Scapula. 14236
Same Loc.

51. Head of Femur.
Same Loc. 14219

52. ~~Distal~~ end of ~~Leg~~ Bone. 14231
Same Loc.

53. Pelvis 14191
Same Loc.

54. Distal End of Leg Bone 14232
Same Loc.

55. Distal End of ~~Leg Bone~~- Burnt. 14227
Same Loc. but on the surface.

56. End of leg Bone. 14227
Same Loc.

57. Foot Bone 14217
Same Loc.

58. Small Vertebra.
Same Loc.

59. Small Vertebra.
Same Loc.

60. Portion of Lower Jaw.
Same Loc.

61. Fragment of Bone.
Same Loc.

62. Pelvis
Loc. South Section 5ft.6in. back of, and from Surface to 2ft. down from D.P.

63. ~~Fragment of bone~~ ?
same Loc.

64. Fragment of Jaw with part of tooth.
Same Loc.

65. Skull, scapula, leg bone Squirrel
Same Loc.

66. Broken Skull Squirrel
Same Loc.

67. Broken Skull. Gopher
Same Loc.

68. Broken Skull Gopher
Same Loc.

69. Lower Jaw. Cotton-tail ?
Same Loc.

70. Portion of Skull Jack-rabbit.
Same Loc.

71. Skull Gopher
Same Loc.

72. Portion of Skull Gopher.
Same Loc.

73. Part of Skull Squirrel
Same Loc.

74. Portion of Skull Rabbit
Same Loc.

75. Upper jaw. Squirrel
Loc. South Section 5ft.6in. back of ar
from surface to 2ft.down from D.P.

76. Skull Neotoma.
Loc. Rat dung N.wall 5ft.back of D.P.
2ft.from wall 4ft down.

77. Vertebra.
Loc. 4ft down in dung layer 3ft front
of Mid-point N.wall 2ft from wall.

78. Vertebra.
Approx. same loc.

79. Piece of heavy bone
In Sloth dung layer mid point N.wall
9ft down.

80. Piece of Skull.
Loc. 4ft down in dung layer 3ft.
front of Mid-Point N.wall 3ft.from wal

81. Piece of Jaw with two teeth.
Same Loc.

82. Piece of Lower Jaw.
Same Loc.

83. Distal end of leg bone Burnt.

84. Portion of Scapula
Loc. South trench in disturbed layer.

85. Part of pelvis
Same loc.

86. Human arm bone ?
Same loc.

87. Vertebra 14252
Loc. South trench in disturbed layer.

88. 2 pieces of Human Skull
Loc. 7ft.8in. forward from D.P. 3ft. south of center line and 3ft down in partially disturbed area.

89. Vertebrae
Same Loc.

90. Fragment of lower left ramus with 4 teeth. Muskrat?
Same Loc.

91. Portion of side of skull 14237
Same loc.

92. Portion of skull.
Same loc.

93. Portion of upper jaw-Human- with three teeth.
Same loc.

94. Portion of upper jaw with 1 tooth Deer?
Same Loc.

✓ 95. Upper and lower jaw Gopher
Same Loc.

96. Piece of hide with short, fine, yellow hair.
Loc. Sloth dung layer, Mid. Point N. wall 9ft. down and 3 ft from wall.

97. Pieces of hide with coarse tan hair, on some longer than others.
3ft back of D.P. 5ft from wall N. side 2ft 9in down ass with Deer dung pine needles

98. Jaw
loc. 12'5½" west of datum point 1" from north wall 3'3" delow undisturbed level in rat dung.

99. Verterbrae and portion of pelvis
loc. 2'3" west of mid point near north wall at bottom of burnt dung layer

Basket Makers

Basket Maker- Site without pottery. First discovered by Richard Wetherill in Grand Gulch, Utah, 1885-1895. At that time by stratographic measurements it was determined that they belonged to an older period than the cliff-dwellers and are the oldest people known so far.

Houses- Have never been identified, probably lived in temporary structures of perishable material located in the open. They used the sandy floors of large dry caves for storage of their crops and for the burial of their dead.
Cist-storage place, slab walled or jar shaped excavation in hard earth.

Grave- B.M. graves contain 2 or 3 bodies, each tightly flexed, wrapped in blankets, accompanied by offerings of food, tools, weapons, ornaments and baskets.

Basket Makers- Were long headed and of medium stature did not practice skull deformation. Were agricultural to a certain dggree, caches contain corn of a single variety, primitive flint corn. Squashes were grown, no beans or cotton. Turkeys were not domesticated.

Culture- Did not use the loom but made large, elaborately ornamented twined bags. Sandals distinct from others of a later period by having square, fringed toe, were twined woven. Coiled basketry- large trays bowls, jars, panniers, water jugs; twilled work in the form of mats is very rare. Fur-cloth- was used for blankets instead of turkey-feather cloth.

Artifacts- No use of bow and arrow has been found. Projectiles were light darts four or five feet long, hurled by means of a spear thrower or atl-atl, a device intended to add greater length and therefore greater

propulsive power to the arm.
Total absence of pottery.
Range of Basket Makers so far as known, fairly limited: Utah, Colorado, Arizona, New Mexico and probably down in to Mexico.
It is the oldest known culture of the south-west-coming before the Post-Basket Makers or Cliff-Dwellers, and the Pre-Pueblo. Lived as long ago as 1500 or 2000 B.C.

From:
A.V.Kidder-An Introduction to the Study of South-Western Archaeology. 1924.

BASKET MAKER CULTURE.

Food: Corn, yellow flint with very small kernals, , yellow and white with possibly a few red kernels. The most primitive corn found.
Squash, apparently the same species as that used by the Cliff-Dwellers.
Acorns, , Pinon nuts, Coreocarpus seeds, Dried fruit pulverized and mixed with meal in small bag, but no beans.
Animal- few bones that could be identified were discivered, but the abundance of pieces of deerskin and mountain sheep hide, bunches of prepared sinew, and fragments of bird skin and feathers shows that probably hunting furnished a part of their sustenance.

Dress: Robes of fur cloth used for dress and to wrap the dead in. Skin robes found on bodies tanned with the fur on. String skirt: consists of a waist cord to which is attached a pendent fringe like a small apron. Tasseled sash of yucca strings woven and "gee-string" of soft, animal wool.

Footgear: Sandals found in great abundance
1. Cross weaving of whole yucca leaves over yucca leaf warps. Made by lacing the leaves back anf orth across the warps and bringing out the larger ends on the underside, where they are shredded into a pad. They have four warps each of a whole leaf; small ends brought to the heel and tied in a tripple knot. Fig. 1. The toe is made by shredding out a bunch of the fibers and fastening these fibers together. the rest of the ends protrude to form a toe fringe.

Footgear cont'd.

2. Cross weaving of crushed yucca leaves over warp of same. made the material easier to handle and the sandal softer. Woven in the same manner as 1. The heel is often somewhat rounded.

3. Cross weaving of thick cedar-bark strings over warps of the same. The string is a thick, soft, loose, two-strand twist of shredded cedar bark. The weft is continuous the warps 3,4 or 5. are attach- at toe and heel. There is no toe fringe.

4. Coarse woven cord sandals with plain soles. Square heeled and toed. Have 10 or 12 warps of stout, two-stranded yucca fiber cord. The weft is thin one-strand cord of yucca. made as in 3 but has double wrap aroud outer warp. Warps are looped at toe held in place by two or three rows of twined weaving. under these are caught short bunches of fiber to form toe fringe. some the fiber form a bolster across the toe. At the heel the warps are knotted together and ends tucked back and provides across the heel a strong heavy ridge .

5. Cord sandals with reinforced soles. Have square toes, fringed with bunches of fiber or deerskin strips; heels are square. Yucca warps 20-30 are looped at the toe and held by twining cross strands. Weft is of yucca or apocynum? sometimes of human hair. Run in by over and under cross weaving or twined. Extra layer of knots or folds produced by means of extra strand along each warp, turned about it every two or three wefts and knotted, twisted or twined about each other as they emerge on the under side. They often have side bind- ings of red.

6. Hide sandals are rare, made of two pieces sewed together at edge, toe loops and heel loops of human hair.

Sandal ties. Regular heel-and-toe loop, with long string tie. heel loop consists of a two-strand of human hair, carried back and forth across the heel of the sandal ten times,-toe loop made of two pairs oftwisted hair cords. Both fastened to sandal. Second and third toes are inserted in toe loop and the heel loop is pulled up over the back of the foot. Tie cords of human hair usually, tied to toe loop brought around the heel loop on outside, carried over the foot, around the heel loop on other side, brought back pulled tight around the original strand from toe, is then looped back and forth four times between toe loop and instep crossing, end is wrapped once about these loops at toe and made fast by a single hitch. Fig.3.

Ornaments: Necklaces of shells, stoens and acorns. Neck cords of two strand twists of rawhide with loop for an eye at one end and a knot for a toggle at other. Pendants attached by yucca and sinew bindings run through the shells or stones, in form of loops. Made also of yucca strings held together by close figure eight weave of sinew. Figs.5,6,7, 8. Bone beads used and lignite ones highly polished. Cylindrical and hemispherical in shape. former mainly of hematite and serpentine, latter of abatite. Shells were olivella.

Cradles: Rigid type with frame of single stick bent into a guitar shape bound wit yucca and cross pieces of reeds, held together by lashings, hair or leather. Flexible type, Grass- rim a continuous roll of coarse grass stalks bound with

Cradles cont'd.
yucca. Back and front are a coarse-mesned woven yucca nettings attached to the grass rim. Padded with corn husks and shredded grass. Also cedar bark shredded. Cedar bark cradles made by weaving a mat of cedar bark strips laid parallel held together by twined rows of yucca leaves with loops for yucca netting of the sides. Fig.9. The bottom is turned up and held by mesh of yucca leaves. Some have v-shaped opening at top laced across with netting.

Torches: rolls of cedar bark tied with yucca.

Brushes: Bundle of plant fibers bound just short of half lenght, bent back and bound again on out side. Fig.10. Type is wide-spread among Indians of Mexico, Arizona and California.

Coiled basketry: Very common, made over a two-rod-and-bundle foundation. Rods are thin round sticks with pithy centers. Bundles consist of fibers, usually yucca leaf sometimes of shredded root. The sewing elements are thin wooden splints Two rods are set side by side and the bundle above. Sewing element takes in the rods and the bundle above and passes thru half the bundle below. Fig.11. They vary in fineness of weave mst have 5 coils and 9-11 stitches. Looking from above the coil runs counterclockwise. Shallow trays are the commonest forms. from 3 inches to 3 feet in diameter. Also large carrying baskets with flaring sides and small pointed bottoms. Some have restricted orifices, trinket or work baskets. Water carrying baskets

lined with pitch, of peculiar shape.

Matting: Rush matting not very common.

Cords; Yucca twisted strands, hair from single twists, to tight twine made by twisting together four to six 2-strand strings. Used for sandal loops and tie strings, narrow bands, loops for carrying baskets, netted hair cloth, cradle lashings, waist bands, and hair dressing strings.

Twined Weaving: Bags. Range in size from 1½ inches long to 2 feet deep and 18 in. in diameter. Very characteristic of B.M. All made in same way over warps of yucca or apocynum? Warps radiate from the bottom new ones added as the bag flares and dropped again toward the neck. The weft is of fine apocynum? strings of a yellowish color, the paired strands running aroun the bag, beginning at the bottom. Decoration consists of horizontal bands of red black and the natural color. Woven bands, coarse type and fine. Coarse made by weaving over and under a single string across a series of strings laid parallel. Fig. 12. Finer ones are made in somewhat the same way, parallel elements are paired and each pair twines about the successive crossings of the binder. The pattern is made by one of the parallel elements being yellow one black and twining changes the pattern. The outside pair is yellow.

Fur Cloth: Fur string was made by wrapping yucca cords with thin strips of rabbit skin, the end of one being caught under and held in place by the beginning of the next. Mountain sheep skin was used, untanned, skins of smaller animals were also used. The fur strings were laid side by side

Fur Cloth Cont'd ; and held in that position by widely spaced rows of twined yucca Ornamented tassels were made by catching bits dark fur from rabbits feet through the strands of yucca string.
Feather string: twisted strings of yucca 2-strands wound with narrow strips of the skin of small birds with the downy feathers on them. Used for edging, tassels, bands or lashings for cradles.

Cedar Bark: Used for cradles, sandals, torches and as padding in bed nets and baby carriers. Bags of bark made with yucca string bark extending down one side across the bottom andup the other.

Leather: Bags and pouches mountain sheep or deerskin used. Pollen pouch sewed with thong and turned inside out, for pollen. Double headed bag of prairie dog skins. Paint bags sewed in an over hand stitch, with yucca string. Sinew used for lacings, feathering atl-atl darts, brushes, neck cords, etc.

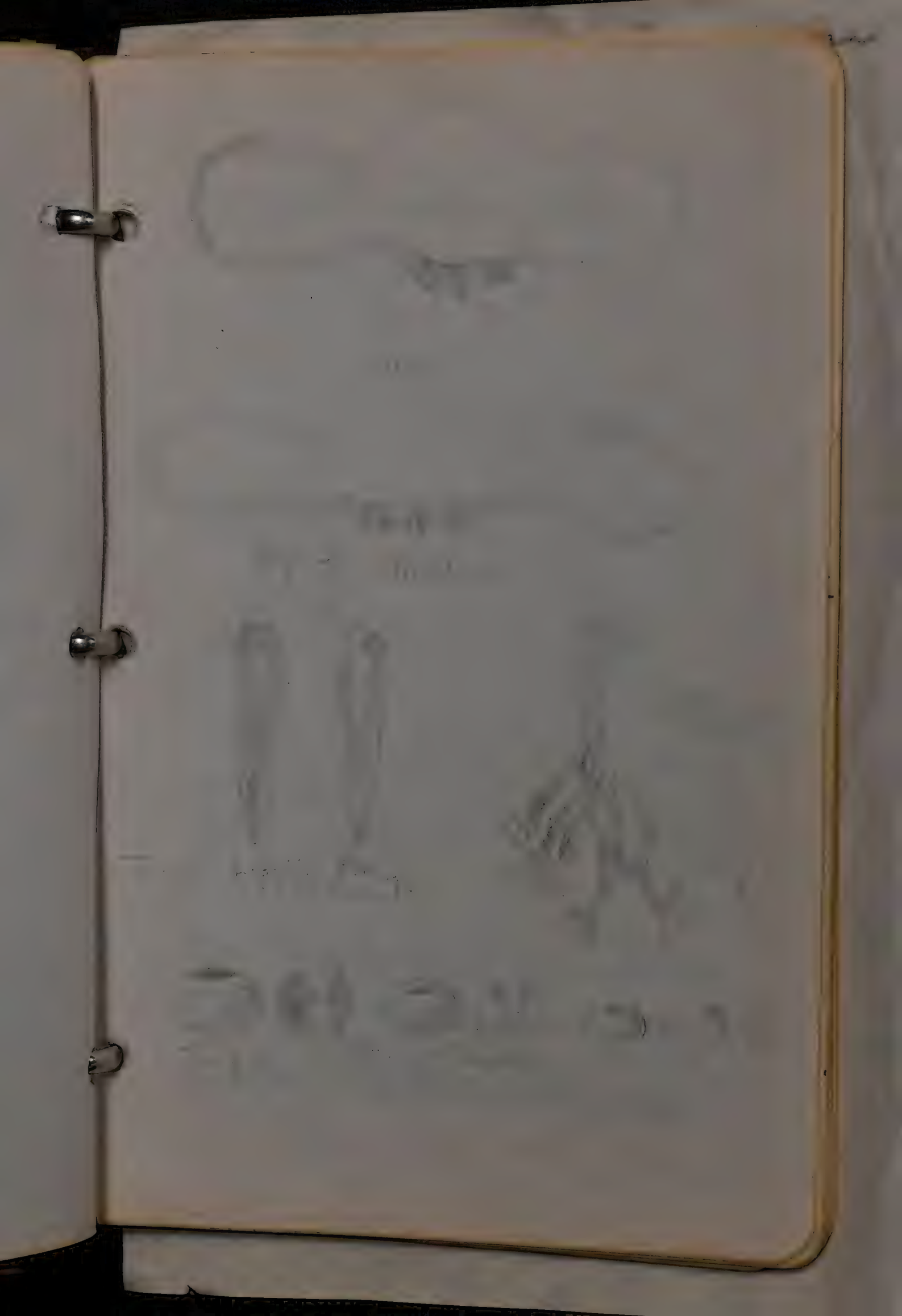
Atl-Atl or spear thrower: It consists of a long thin stick with a grip for the hand at one end, and a hook like spur to hold the butt of the spear at the other. In throwing the butt of the spear was pladed against the spur at the end of the atlatl the head projecting in front of the hand held in position by the fingers which passed through loops on the sides of the grip. For the throw the atlatl was brought forward and then whipped over. On the atlatl was a small stone object fastened by bindings. May have served as weights. Length over all is 26in. spur is 3in. from end and handle 4in. from the butt.

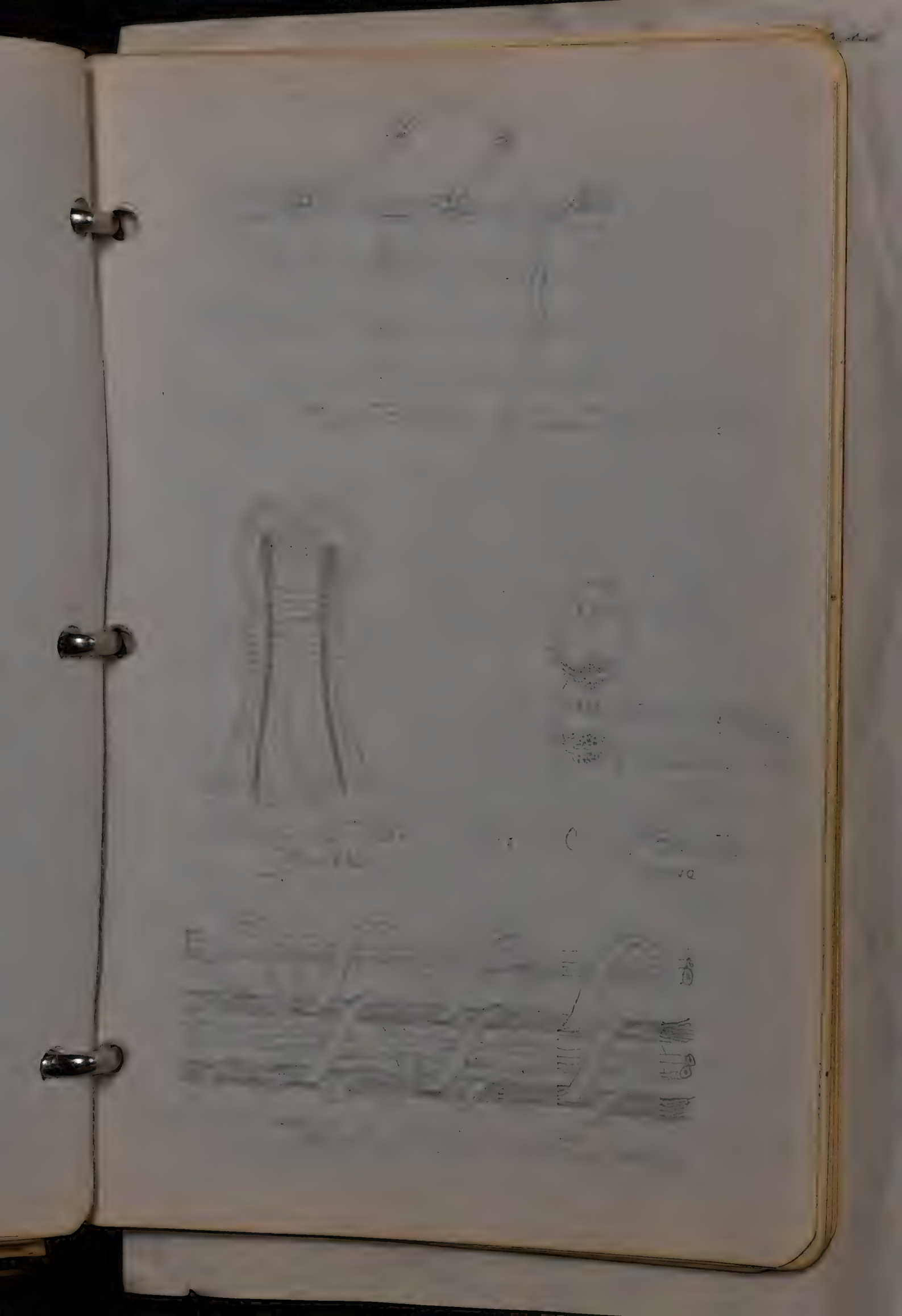
Darts: Length not known, made of some light but strong wood with small pith heart. the butt of each is provided with a shallow cup to engage the spur of the throwing stick. The ends were wrapped with fine sinew to keep the spur from showing too far into the cup and splitting the shaft. The tip of the spear was provided with a foreshaft set in a hole drilled in the end of the main shaft. Foreshafts about 6¾ to 4½ inches long, butt tapered to fit into the main shaft. The tips were deeply notched to receive the stone points, made fast with seizings and gum. The chipped heads were either plain or tanged. they are thin and finely chipped. Stone scrapers were used.

Various wooden objects found: Scrapers or mashers, whistles, awls, (bone ones too)

Other objects. Stone pipes, clay pipes, dice, gaming sticks, various kinds of scrapers, drills, rubbing stones, axes and knives.

From:
Kidder, A.V. & Guernsey, S.J. Archaeological explorations in North-Eastern Arizona Bulletin 65 Bureau of American Ethnology 1919 pp. 154-192.





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Nusbaum,J.L.A. Basket Maker Cave in Kane Co. Utah; with Notes on the Artifacts by A.V.Kidder & S.J.Guernsey. Museum of the American Indian,Heye Foundation; Indian Notes & Monographs. #29 1922. New York.

Tillim's Cave

Burial #1

Burial covered by large basket, mostly decayed. Two children, close together and third in close proximity. Partially cremated adult burials surrounded these on all sides, were probably contained in large baske., fragment of which remained. Two children with close together covered by some netting (apparently knotless) the upper skull was covered by a small inverted basket in good condition. Pieces of dried skin still adhered to skull.

Burial #2

Fragments seemed to indicate that cremated bones of adult, and child had been contained in large basket.

Articles

Flint stone and spiral sea shell beads found around lower skull.

Bone Awl in Bone- fragment of bird bone with square side opening and small needle inserted crosswise to opening, whistle?

Work in Wood-

1. Small wood strips painted in red, black and white, flat and rectangular in shape each with different design. Associated with large basket close to Burial 2. Carved spindle shaped stick carved, found near strips.

2. Several foreshafts one still inserted in reed shaft of main shaft. One bound with sinew, all approximately same size.

3. Butts of 2 arrow shafts of reed strengthened with sinew, with characteristic incisions for bow strings in end. Found in disturbed area doubtful basket.

4. [illegible] attached to shaft

bound with sinew comes from disturbed area, may be of later period. Point is serrated with a deep tang and but slightly set in base of shaft.
5. Lengths of stick, bearing obvious trace of workmanship. Use problematical.
6. Base of one wood arrow butt.
7. Fragment of hard-wood strip with 3 holes of different sizes bored in it.

Work in Stone-

1. Asymetrical arrow point-oppositely beveled, lopsided may have been used as a small knife. Length 2¼". Max. width 1". From disturbed level.
2. Typical Basket maker arrow point. Tanged, evenly chipped. L. 1½". W. ¾". Disturbed area at mouth of cave.
3. Nicely worked knife 4" long, max. width 1¾". Black slatey material.
4. Three small scrapers or knives of similar material no. #1 chipped, one 2" long, oval in shape, other 3" long oval at one end, pointed at other.
5. Crude point of some material 2½" long x ¾" wide, pattern suggestive of certain points considered to be old found in Eastern deposits. Slatey material in common use.
6. Ball of purple paint associated with burial #1, 2" in diam. One red ochre.
7. Obsidian (clear black) paint, unfinished and prbably rejected.
8. Crude flake of red stone, showing secondary chipping found in disturbed level.
9. Pendant of black state material from top of ash layer 4" long x 2½" max. width.

Cordage of Textiles.

1. Two-strand corded yucca fibre. Two-strand, each composed of yucca fibre bound with sinew. Most cordage of 2-strand type.
2. Three-strand rope of yucca, each strand

composed of smaller 2-strand cordage. Some more loosely wrapped.
3. Several textures of fibre were used, some more resilient than yucca, some soft and more fragile, with little strength. Size of twine varies from small string to rope size of clothes line. Pieces of cordage found thru-out the cave.

Sandals.

Great variation in sandal making of yucca fibre.
1. Wicker weave including instep and toe straps. Only 2 exterior bunches for woofs.
2. Woven type with four strands for woof. Found with Burial#2.
3. Variation in method of twing.

Bags.

Traces of bags of fine fibre, sometimes dyed red, no complete ones found. Traces of knotless netting on both burials.

Matting.

Of light red bound together with cord. Also matting over under weave of flat grass.

Cloth.

Very fine texture, dyed a purple color, but disintegrated at touch. Some found in fold with Burial#1.
Near Burial#2 quantity of rabbit fur, probably a rabbit skin blanket, net work, (knotless netting) covered Burial#2. Only twisted hide with fur off left. Yucca fibre twine knotted at the ends twisted twice between each strand of twisted rabbit skin.

Basketry.

1. Complete small basket from Burial#1. Held bottom down, work goes counter-clockwise. 5½" diam. Stitches interlocking.
2. Small fragment of basket, weave composed of one stick and bundle and interlocking weave. Also fragment as above but two sticks and bundle.

3. Complete basket from proximity of Burial#2 bearing traces of design, 2 sticks and bundle. Very fine close interlocking weave, outer-clockwise.
4. Remains of basket, 2 sticks and bundle not interlocking.
5. Basket over Burial#2. Flat sections of fibre take place of round sticks, and across, flat fibre takes place of bundle.
6. Bundles of yucca fibre, wrapped, being stored. Yucca chain. Matting of strips of yucca.
7. Stick 1" long with flat twisted point found driven in matted grass.

Burial #2. cont'd.

Found on cradle - 36" long x 13" wide at top. Triangular in shape, three bars lengthwise, five cross bars. Reed over bars, fastened with yucca cord.

Mummy wrapped in antelope or deer hide and wrapped with cord. Rabbit fur robe of twisted skin over top. Flat plaited cord coming out beneath skull and entering bundle lower down. Baby one - 1 yr.

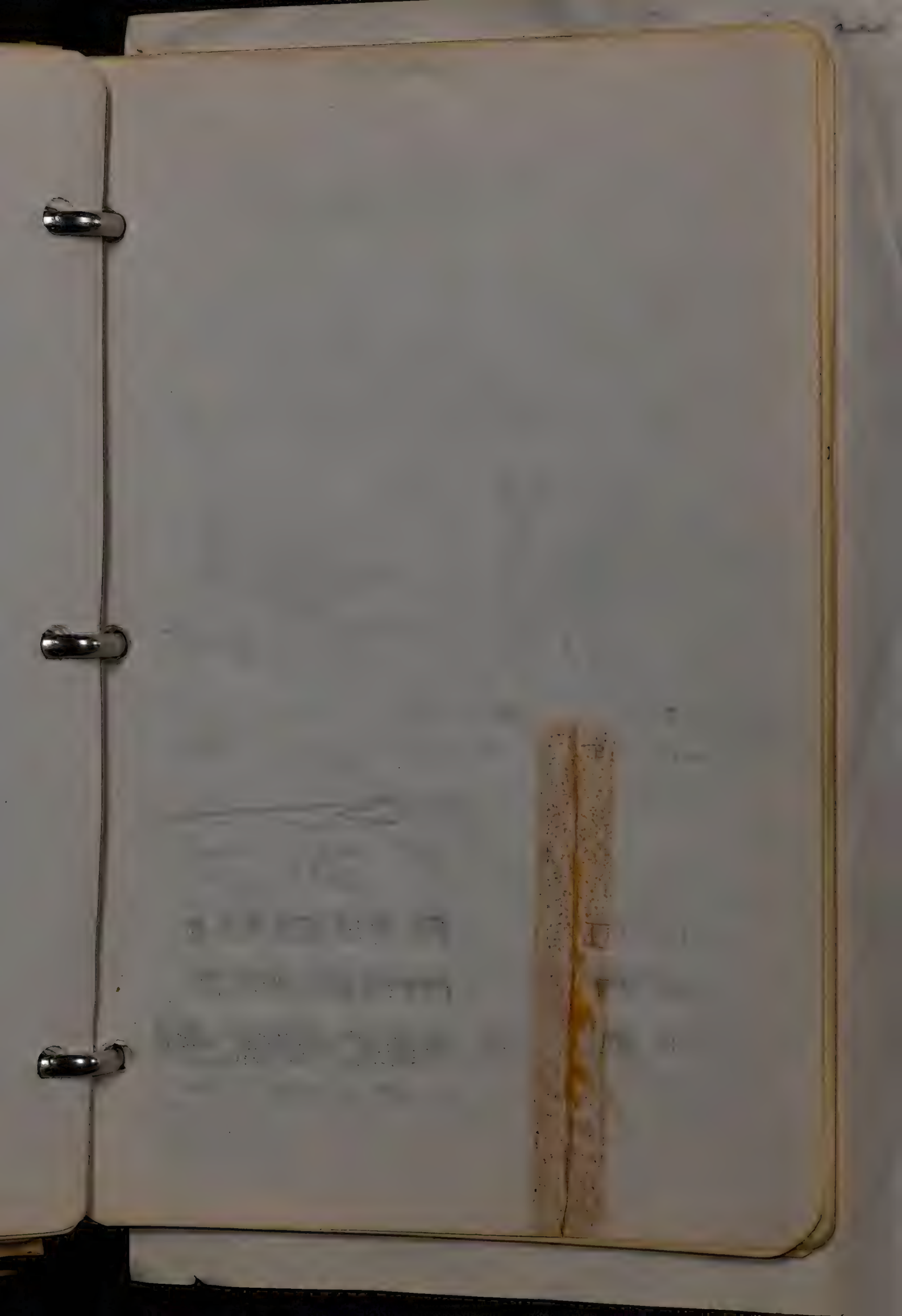
Bag burial cremation. Inside wrapped with red dyed cord. Trapped in antelope hide. Burned bones of an adult.

NOTES ON WILLIAMS CAVE,
from Mr. Howard.

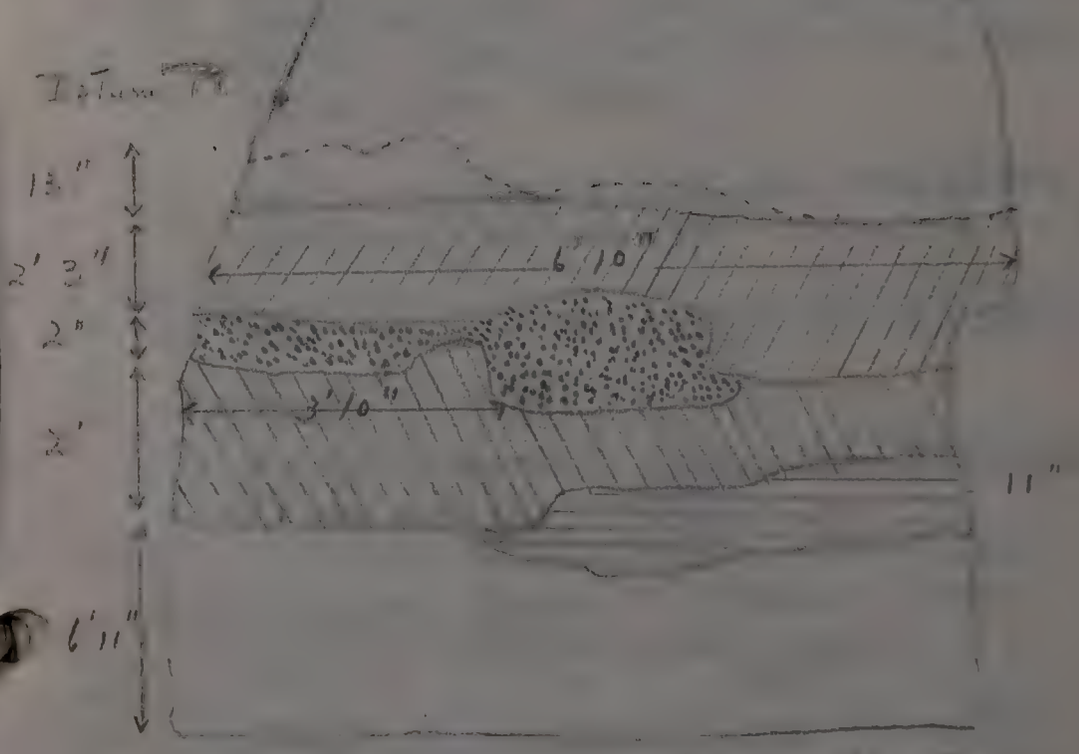
Measurements below datum point thru section B.B.
Sloth begins at 50" on line B.B. thru datum point.
Bat guano begins at 22" down to 41" soft. Hard bat guano 41"-50".
Basket Makers down to 22".
All layers rise toward back of cave.
Bottom of cave approx. 7'9½".
Height of cave above datum point 53".
Rock strata has slope of about 20°. toward back.
North side Sloth dung 43" below datum point.
Layers thru section from datum point to right. Depths taken from datum pt.
Top layer 3' dust, fibre, rock, rat dung, layer varying from 2-4in. of burnt dung?
Layers in front part and in left side of cave. Charcoal fibre and dust 18".
Then 3" yellow dust, crushed rock.
Below crushed rock, slight yellow dust.
Burial #1 dug partly into yellow dust layer.
Burial #2 wholly in top layer.

Burial #2
Found wholly in top layer.
Cradle triangular, 5 cross bars, one
down center. Reeds over bars, fastened
with yucca cord. Mummy wrapped in
antelope or deer hide, in turn wrapped
with cord. Fur robe of twisted skin
over top. Flat plaited cord coming
out beneath skull & entering bundle
lower down. Skull immature, 5 no.-year.

Bag Burial Cremation.
Inside wrapped with red dyed cord.
Wrapped in antelope hide. Burned
human bones of an adult. 19" long
by 12" wide.



Cross Section of Cave Floor at Datum Point, Ft.



Key.

---- disturbed line as found.

present undisturbed surface

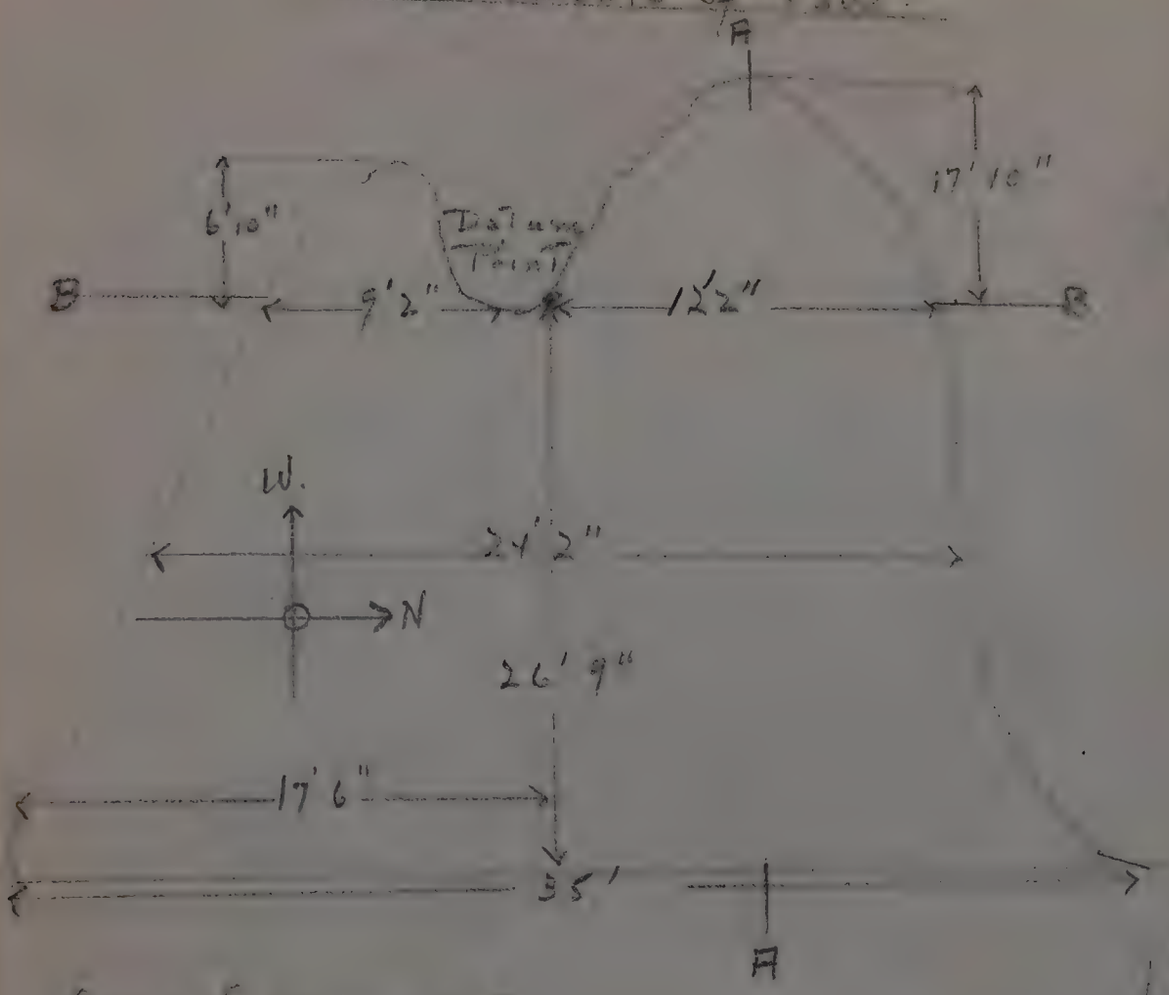
burnt dung & charcoal.

unburnt dung

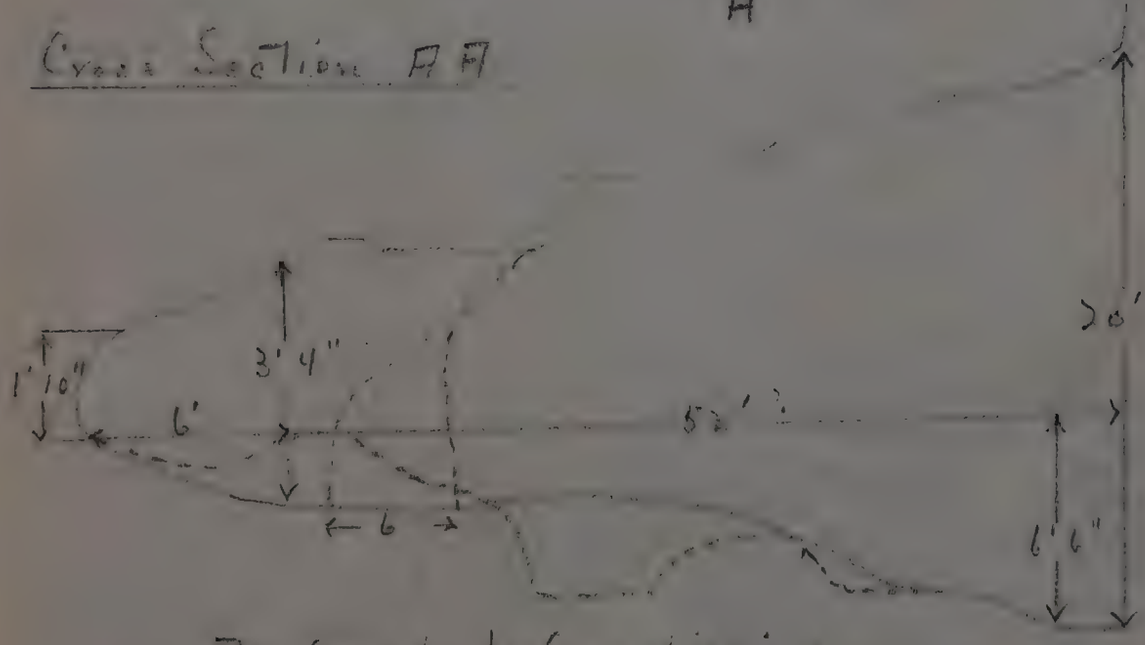
twigs, stone, dust, cloth &c.

Two layers of ash with unburnt grass between them 1" layer of burnt grass then burnt dung.

Measurements of Cave



Cross Section A A



--- As found before digging
—— Original surface.

BASKET MAKER MATERIAL FROM WILLIAMS CAVE.

1. Large sandal 3 feet from back of cave north lobe 1 foot from wall and 6'' below fire level.

2. Small sandal found in dump heap south in front of cave.

3. Part of sandal found in disturbed layer of south trench.

4. Part of sandal found in disturbed layer of north trench.

5. Knotted yucca ? strings found in south trench in disturbed layer

6. Piece Of basket found in south lobe 5'6'' back of datum point 4'' from south wall and 1' down.

7. Pieces of knotted yucca? fibre found with #8.

8. Ball of string of yucca fibre ~~and rope of human hair~~ found 12'5½'' west of datum point on north wall 3'' down in rat dung and ashes.

9. Arrow head found 12'5½'' west of datum point 1' from north wall 3'' down in ashes.

10. Handle found 7⅛' west of datum point 16'' from north wall 4' below datum point

11. Stone found with #1.

12. Corn and husk found 7'8'' east of datum point 3' south of centre line and 3' down in partially disturbed area with pieces of human skull.

13. Rib found with #12.

14. Sloth? dung ball found mid-point of north wall 9' down 1'from north wall.

15. Horse dung found close to north wall at bottom of unburnt dung layer. 6' down and 3' forward of mid-point.with fragment of upper jaw of horse #1.

16. Sample of earth with lime found 18' down. near north wall 10' back of mid-point.

17. Part of bound shaft found with #6

18. Same as #17 but unbound.

19. Pieces of shaft found with#6.

20. Small smooth stone associated with lower jaw of deer #2 2" down in ashes 2½' from wall 3' down from red mark (Mr. Howard)

21. Small bone scraaper found in north t[illegible] trench in burnt dung layer.

22. Bone awl found in disturbed area 3' east of datum point center

23. Hollowed bone chipped at both ends 1' south of #8.

24. Chipped bone awl found in disturbed area.

25. Red bead found in disturbed area on south wall.

26. Stone scrapper found in north trench in front of cave four inches down in undisturbed layer.

27. Chipped piece of stone from south trench down 1' from undisturbed layer

28. Broken mano in south trench near #27.

29. Hatchet, stone, in north trench with matate and mano.

30. Digging stick found in disturbed area.

31. Small digging stick found in rat dung and ashes near deer jaw #2.

32. Two pieces of worked?stone. found in disturbed layer.

33. Small stone found in disturbed area.

34. Sloth ? Dung found 7½'' back of datum point in layer of sticks and pine needles 4'8" down.

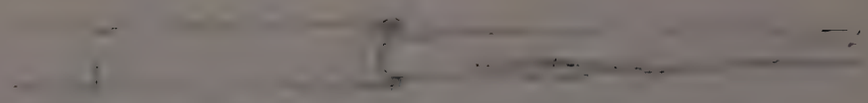
35. Pine needles and pine cone found in sloth layer nort, trench.

36. Miscellaneous pieces of rope, knot-

fiber, pieces of basket and weaving
etc.

Williams Cave

18



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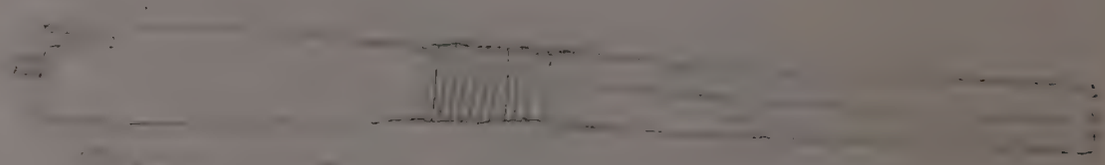
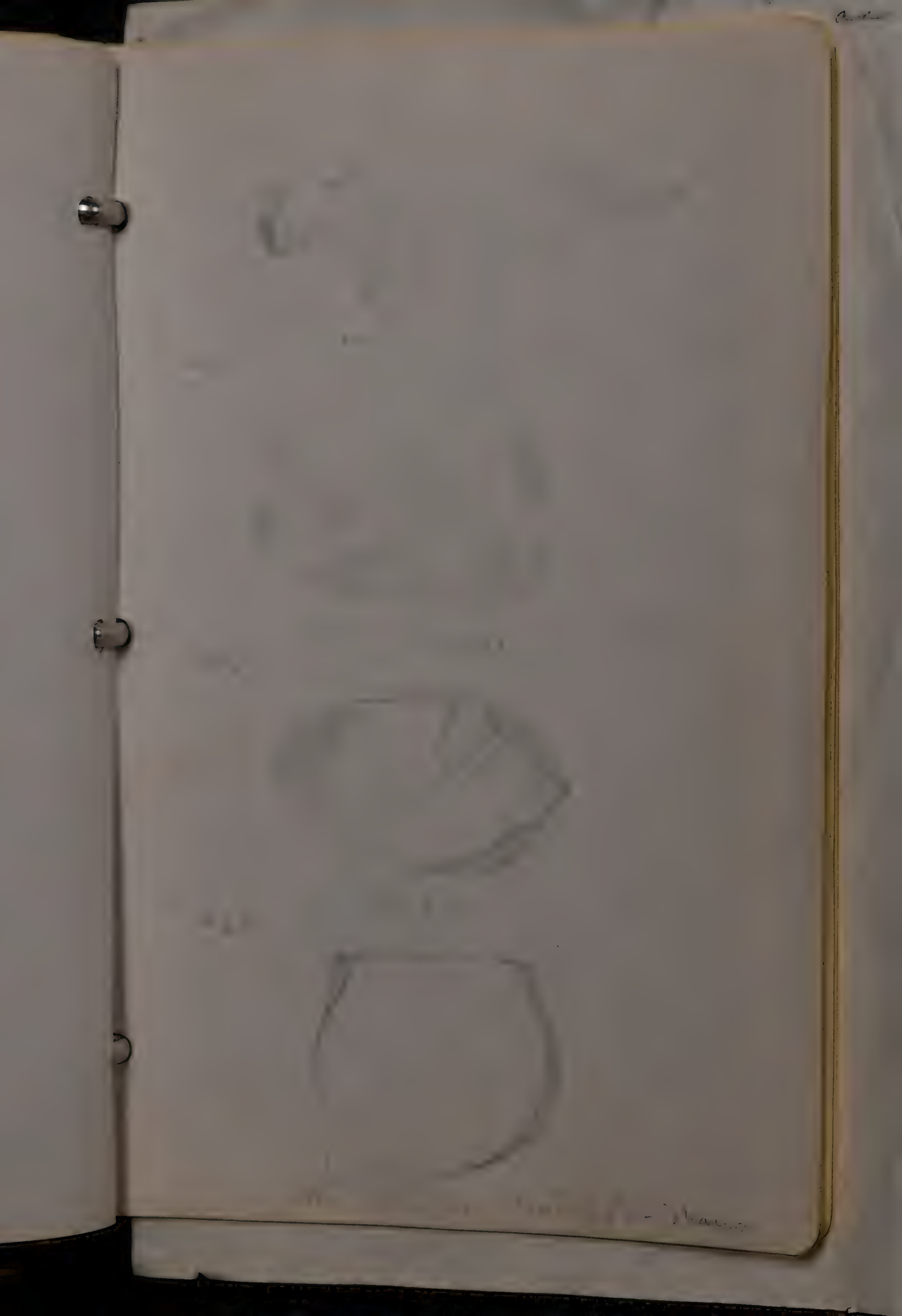
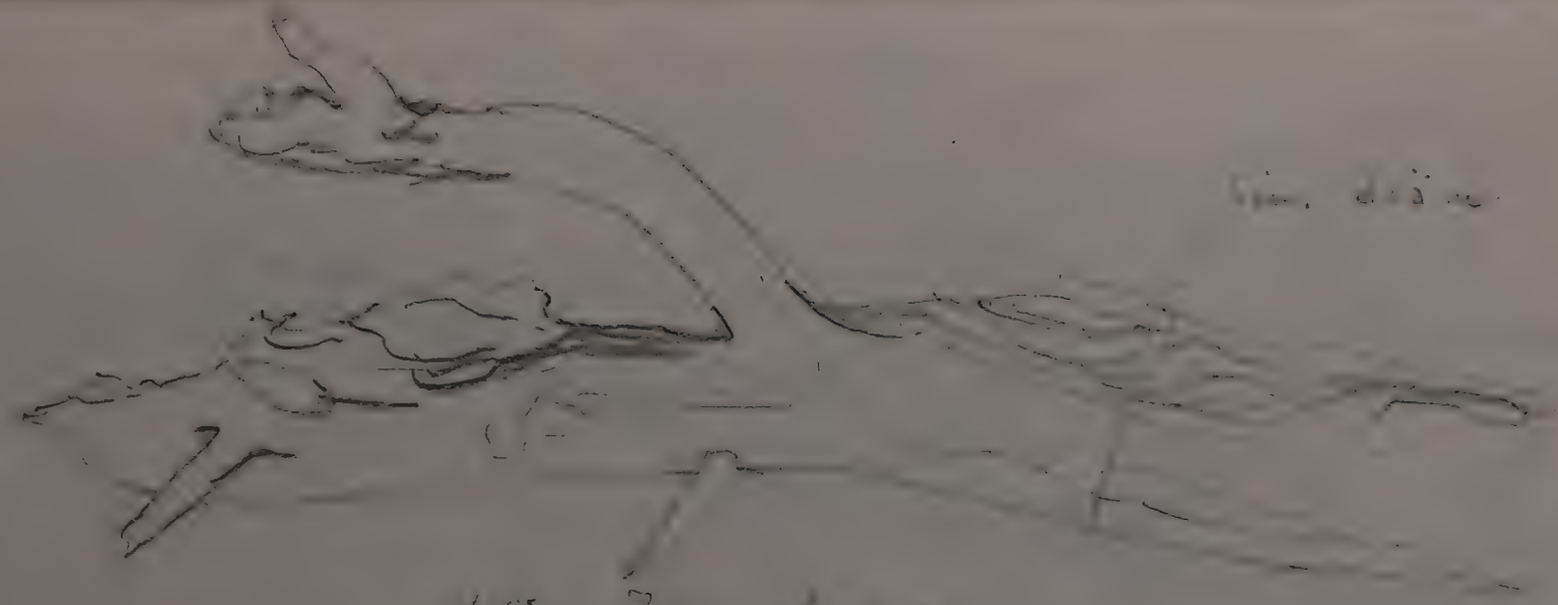
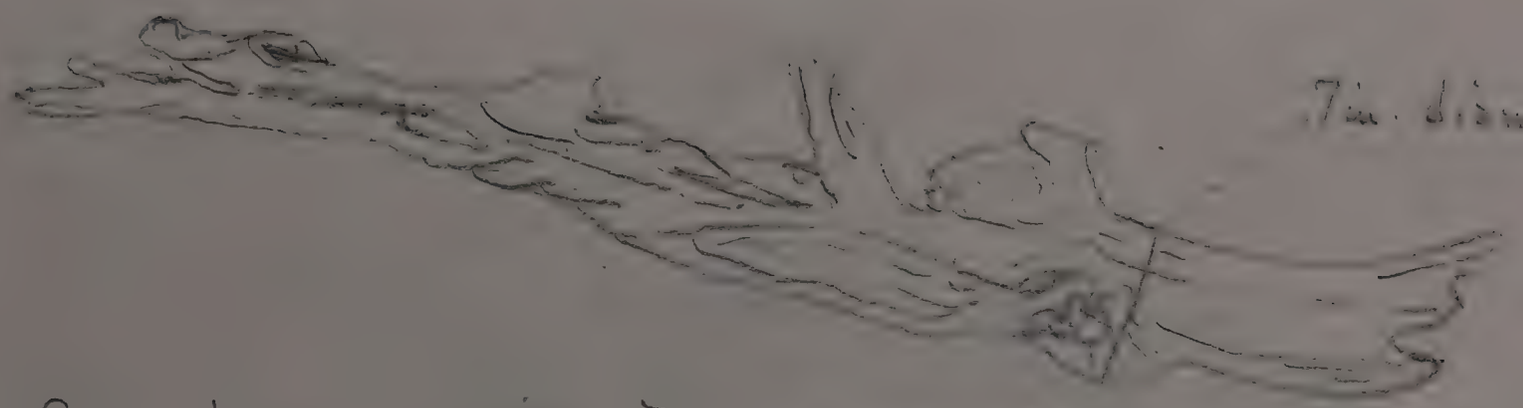






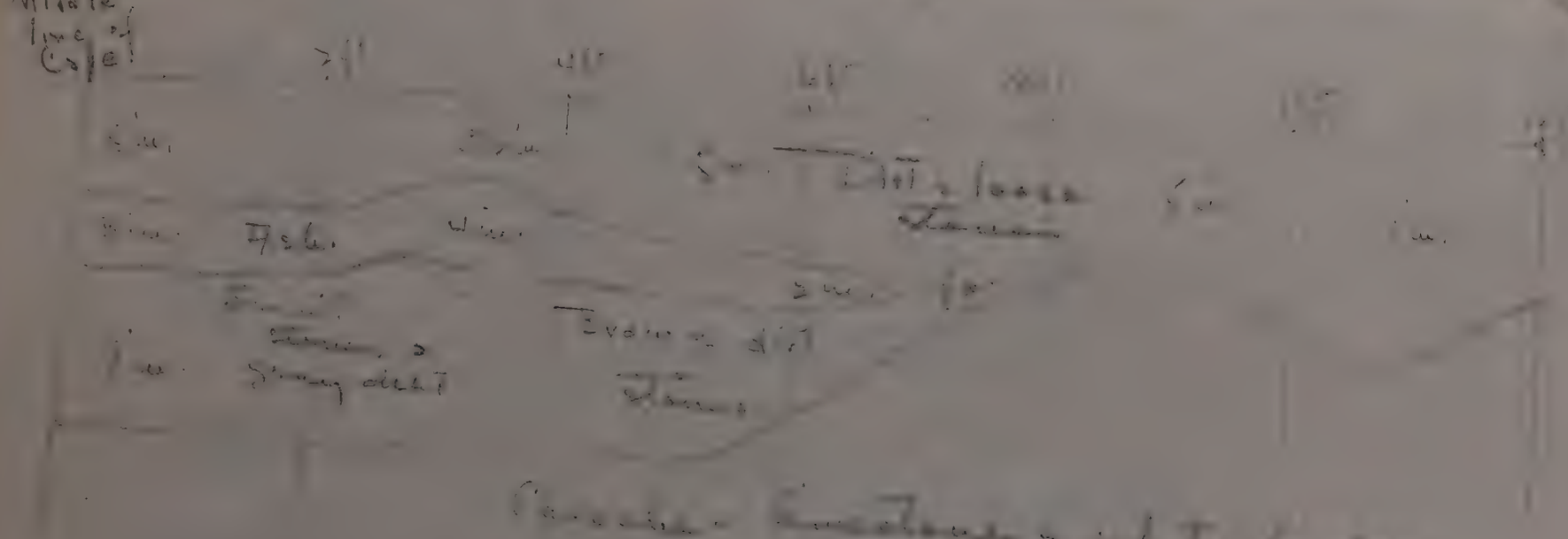
Log found alongside of Cradle Burial, away from wall. Embedded in rat dung & rocks, many pine needles in rat dung around it. Butt end toward mouth of cave.

3 ft. 10 in. long

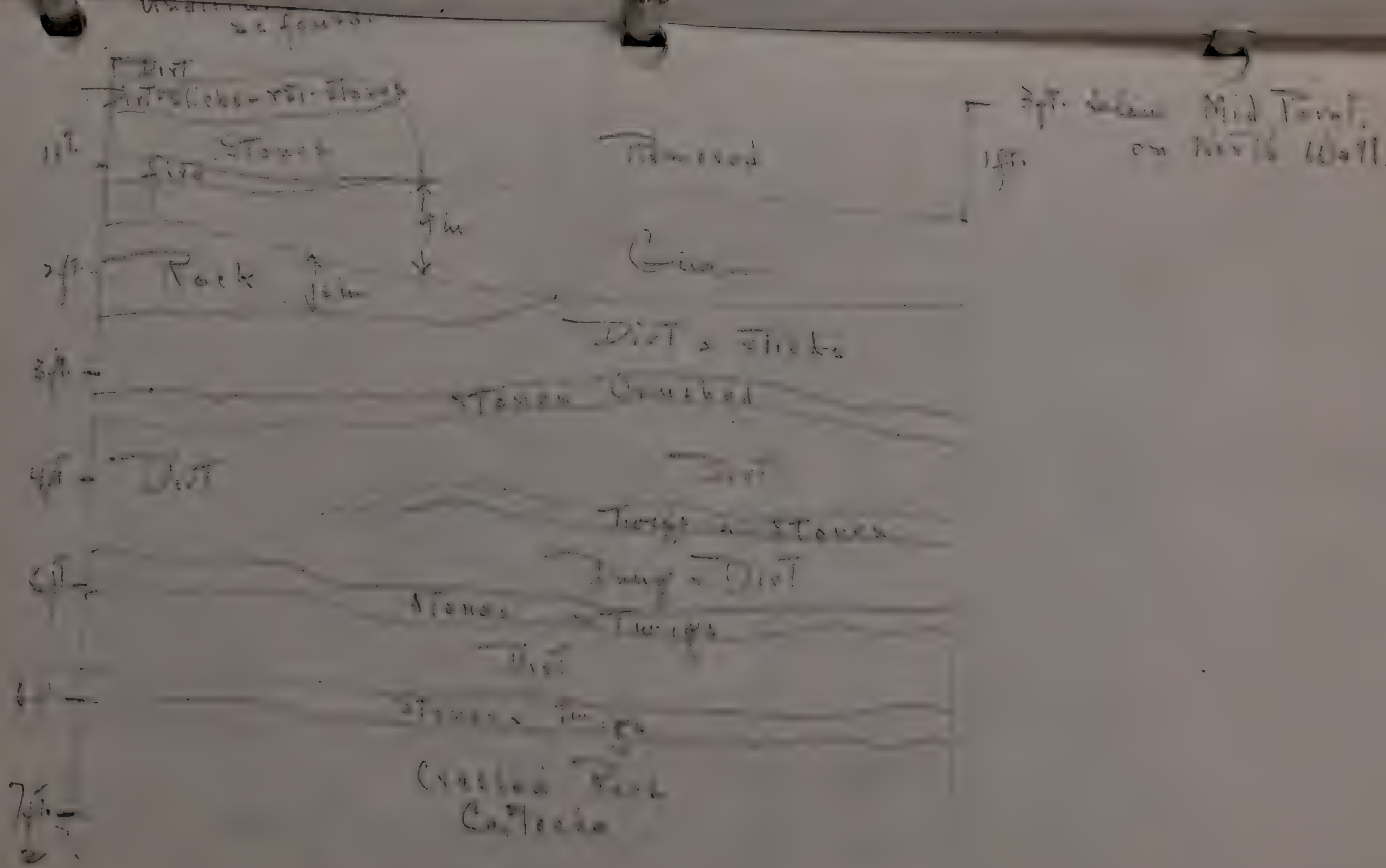


.7 in. diam.

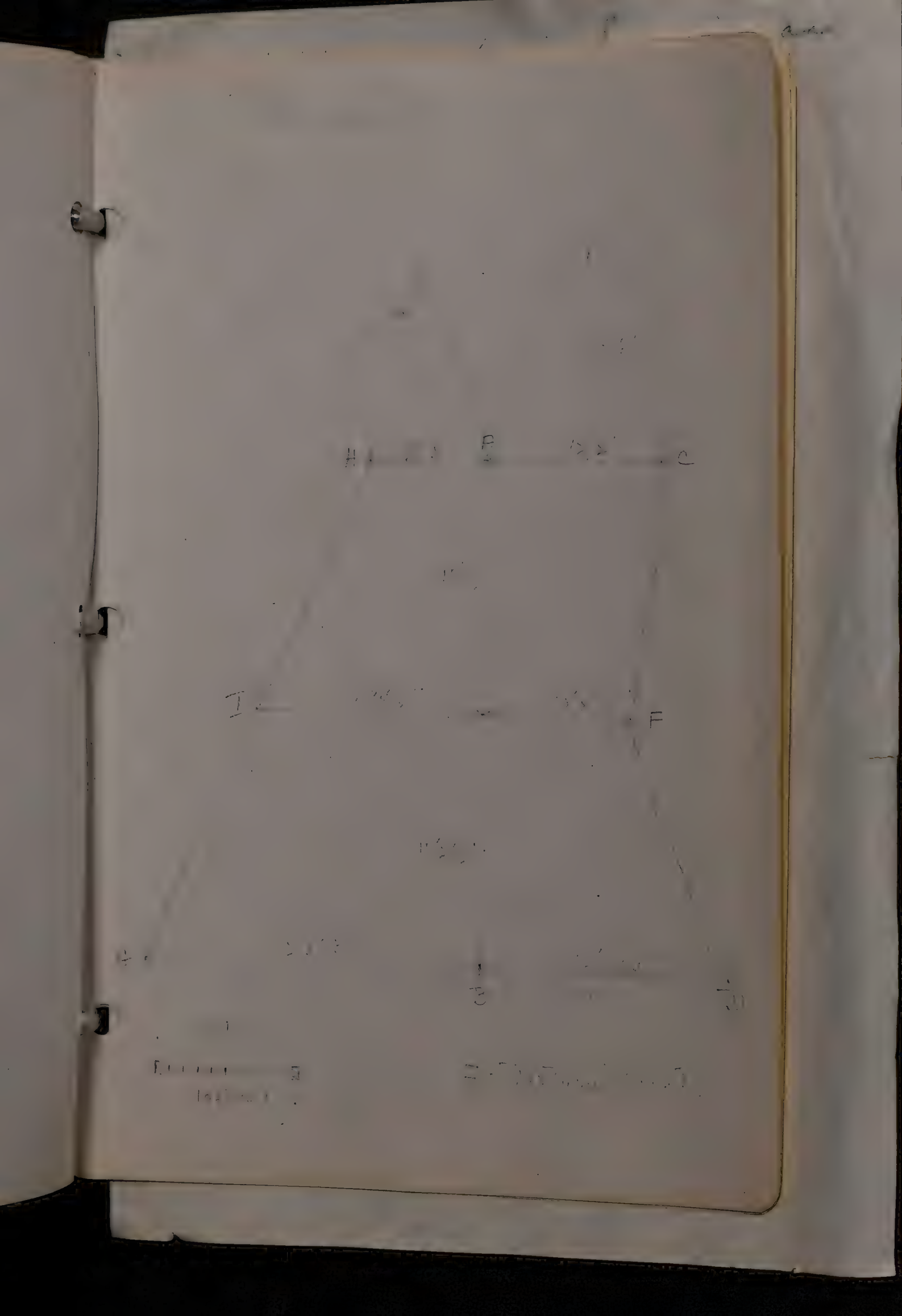
Log from layer of sloth lying about 2 ft. back of mid-point on north wall, 1 ft ½ in from wall. Butt end at bottom of sloth layer, small end extended into gravel above. Very old, rotted and worm eaten - pine needles associated with it

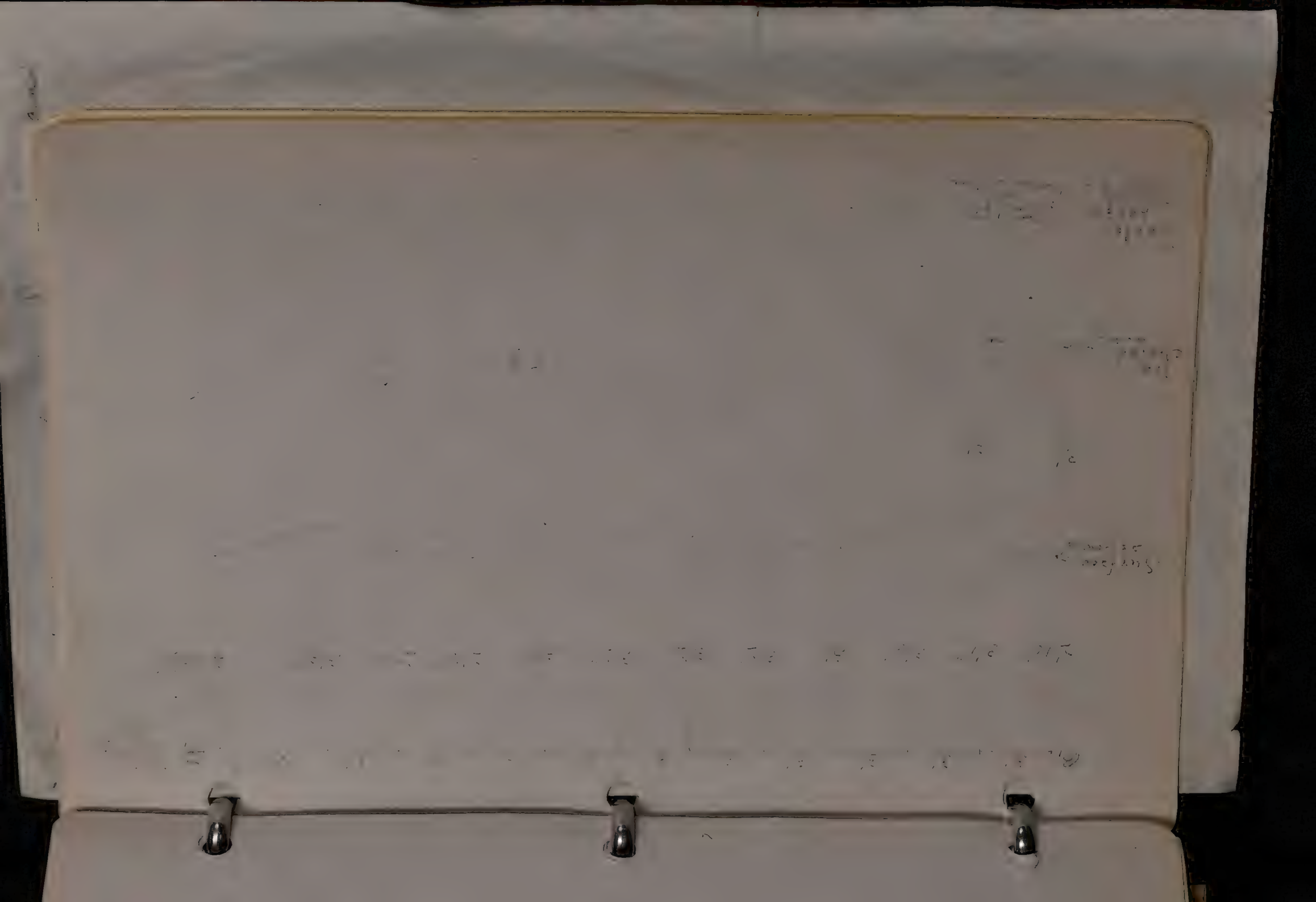


Cross-section of Trench 12 ft long
running North & South across mouth of Cove
from North wall.



Cross-Section at Mid-Tunnel on North Wall.





Work on Williams Cave.

July 3rd Arrived in Carlsbad. Called on R.M. (Bill) Burnet and arranged for him to see Shafter Ward about taking us out to the cave. Also found out what equipment would be necessary in addition to Mr. Howard equipment which had been left with Burnet. Saw the material taken out of the cave last summer by Mr Howard as exhibited in the Carlsbad Museum.

July 4th At 7:30 A.M. R.M. Burnet & Shafter Ward called at the La Caverna Hotel and after much talking on the part of Bill Burnet, we arranged to meet Shafter Ward at Pine Spring Camp. Walter Glover Ranch Jones on Friday July 6th at noon, hoping that Norman free to help our necessary purchases. Later we drove out to Pine Spring Camp. Secured our Rooms and left most of our luggage and equipment. Pine Spring Camp is 63 miles from Carlsbad. Twenty miles of the road is black top the rest is

gravel road, and not very
good. We came in just N.E. of
[illegible] Peak [illegible] 5400, and
to 5840 ft. The highest point
on the [illegible] Pass.
The accommodations are fine
but water only where we can
[illegible] there to [illegible] it. The
food is only very fair. The
altitude [illegible]
[illegible]
[illegible] —
We returned to [illegible] for
the night and had [illegible]
[illegible] of the
[illegible]. [illegible]
[illegible] N.E. [illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
very early.

[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]

the cave. You continue on the road to El Paso for about eight miles then turn in on a private road leading to the Williams house, due West. The road is nothing more than an improved (somewhat) cattle trail, with plenty of rocks, dips holes and arroyos, but taking it slowly & you can make it, although it's bad on car and particularly tires. Continuing on this road for 2 miles you then strike north across the desert for .6 of a mile. This part is very rocky and the greasewood bushes on both sides scratch the car up beautifully. You leave the car there and walk the last quarter of a mile up the canyon, the last stretch is very steep right up the side of the canyon to the cave. We looked the cave over and decided to start digging from the front of the cave on the north side, until we could get someone to clear away the pile of dirt which

extended across the mouth of the cave from three to four feet deep above the undisturbed layer. In digging a trench on the north side we could work back to the ditch already dug by Mr. Howard the previous summer and eventually cover the entire north half of the cave. Apparently the cave had been pretty well dug out as there was practically no section of undisturbed level apparent any where in the cave. We started in by clearing off the dump in the front of the cave.
Shafter Ward had planned to see Uncle Dolph that night but apparently he hadn't returned home so he came back & spent the night at the camp.

July 6th Saturday. Put in our first full day at the cave. Shafter Ward spent the day with Uncle Dolph trying to smooth things over for us, because apparently he didn't want anyone to work his cave at

all. He would consent if Shafter Ward or Bill Burnet were working with us but not otherwise and that was out of the question, as both were working and anyway it would cost too much. We started out by taking our measurements of the cave, marking off where our trench would go, and taking pictures of the cave practically as we found it. It took all day to clear off the dirt down to the undisturbed layer, on the north side, where we were going to dig the trench. Found a number of small mammal bones, bits of rope & such like but that was all.

July 7th Sunday. Shafter Ward said that he managed to arrange things with Uncle Dolph Williams so we might go ahead with our digging and we arranged to have Walter Beale, "Smokey" work for us at a very reasonable fee. Shafter said he wouldn't stay any longer, apparently he didn't want to dig so he left. And the three of us started out. Smoky is a splendid worker, interested in the work

and ready to do anything asked of him. He started in by removing the dump from the entrance, the south half, a tremendous job, as the cave sloped down at that point and the dirt was four to six feet above the undisturbed level.

We continued to dig out north trench, found a layer of ashes scarcely three inches below the surface and found a metate and a mano, a large flat stone with a worn depression in it and close by the large round stone they used to grind the meal with, on the stone. Very little else was found in the front as little bones even.

The trench is 12 ft long and the line B.D. runs thru the middle of it as started = ft wide.

July 5th Monday. On the way out to the cave, early in the morning we saw a Jack-Rabbit which smoky shot for us, so (1) I made him up when we got to the cave skinned him and finished him that evening

In digging out trench, 17 inches down we came upon a layer of what is called caliche. It is limestone & gypsum & under is crushed rock, terribly hard to pick & dig. The layer has absolutely nothing in it and ran from the wall to the center, sloping up toward the wall within a few inches of the surface. Every in digging away the dump heap found various small objects of stone [illegible] small [illegible], in good condition.

July 9th Sunday. We decided to [illegible] [illegible] about caliche. So we drove into Carlsbad and took some samples along. Mr. [illegible] was out of town so at lunch we saw Mr. A. [illegible] and he said he would try and help us, so [illegible] samples [illegible] [illegible] which we did. He [illegible] admitted that he [illegible] it [illegible] [illegible] [illegible] it was not caliche. But he arranged for us to [illegible] with [illegible] [illegible] of the [illegible].

Colorado Company. When we met Mr. Smith he said he would rather make an analysis of our samples because he would then be able to tell us more about it. The report we received later, to the effect that the caliche was formed by limestone and gypsum and had a slight trace of nitrate in it, due probably to [illegible] amount of bat [illegible], which [illegible] in [illegible] tact with the caliche. He said that as far as he could say, the caliche had been laid down at a very early date, in all probability before anything else was in the cave in other words he didn't believe it would be worth digging through it.

July 10th Wednesday.
We decided to dig a small hole in the caliche to see just how deep it went and whether it remained constant, or, its composition changed. We started a hole about three (3) ft square

and went down 6 ft. from the original level of ~~[illegible]~~ caleche. The formation was constant, varying only in its solidity. Sections of it were very hard with more chips of limestone, others were very crumbly with very little limestone in it. There was absolutely nothing in the caleche, no sticks, grass, dung, or bones, it was absolutely barren of anything.

We continued pushing our trench west back in the cave digging down only a few inches in the caleche. The layer of caleche continued to keep about the same level, close to the surface along the wall and down about 15 inches at the south end of our trench. There was a layer of ashes with bits of charcoal in it varying in width from 2-4 inches at a depth of from 3½ - 5 in from the layer, undisturbed ~~[illegible]~~ in the south half of the trench. Above and below this were

layers of dirt, loose stones, grass, few twigs, and very few fragments of bones. Several stone scrapers, and a red stone hatchet were found close to the metals and mano in the layer of ashes.

July 15th Monday.
The north trench progressed rather slowly and with little material found. Great quantities of chips of bone found but no complete ones to amount to anything in the first seven feet from the front. The layer of caliche was found to be much lower down and continued to slope down from about 7 ft from the front of the trench. The trench up to that point had continued to be about three ft. deep from the undisturbed edge as uncovered, down to caliche. From then on the caliche was much lower sloping steeply.

July 17th The dump heap in the front of the cave on the south side was six feet deep, the undisturbed layer being a mass of rocks and just under these caliche, which continued to run to the south wall. In removing this it would make it possible to dig a trench N.S. on the south side of the cave otherwise there would be no place to put the dirt removed. In the dump were found various pieces of bone, string, rope, a sandal, bead and a few other things but there was no way of knowing where they had come from. Apparently the layer in which Basket Maker material might be found had been entirely removed from the south side of the cave half way back to the datum point. A narrow trench had been dug along the south wall to about a line with the datum point. A hole of considerable size had been dug just west of the dump. Hopper Ward said he dug the hole and took out a horse's hoof.

which he had sent to Mr. Howard. The back part of the South Lake had been dug out in spots but not entirely so we planned to clear it out later.

July 20th Saturday
The dump heap was finally cleared away from the South side and as we had cleared away the undisturbed layer in digging our north trench there was a strip running down the middle about 8 ft wide and 7 ft deep at the front. Smoky's last day with us as he had a job offered him with the Railway Maintenance. The north trench was carried back to about 3 ft forward of the mid-point and had narrowed down to a 5 ft. as the north wall curved in. The trench was 7 ft. deep from the small portion of undisturbed layer as found at the south end of the trench. At this point close to the wall 4 ft down from Datum Point was

but he is not very good and we shan't keep him but a few days. Continued the north trench to the skid point carrying it back at the same level.

Widing a trench on the south side 11 ft. long by 6 ft. wide and 3 ft deep from the undisturbed level, which we had uncovered. The trench started from the south wall and extended at right angles across the cave. Close to the wall and out about 3 ft. a hole had been dug previously as the earth had been filled in. We found caleche at this point too at the 3 ft depth, except for the first foot we found nothing of interest. There were layers of ashes and charcoal but flown but no Basket Maker material. We found hardly any bones, a few twigs and grass, the whole section was a mass of large rocks and layers of crushed rocks and dirt with caleche at the bottom. Apparently the whole south side was a mass of large rocks which had fallen from the ceiling

and none of it looked very promising.

July 29th Monday.
We carried the north trench back to the mid point on the north wall, where we came upon the first evidences of Sloth. 7 ft below the datum point we found a large ball of dung presumably Sloth. The layer in which it was found had a great many sticks, of which we kept a sample, pine needles and pine cones, also samples, a few rocks. Two pieces of skin with hair on them one coarse, light buffy in color, the other fine and yellowish. Several pieces of heavy bone were associated with this found at the same depth about 2 ft from north wall.

Two feet back of mid point we dug up a very old rotten and worm eaten log, 3 ft 10 in. long, 7 in. diameter. At the point this extended from the bottom of the Sloth layer up into gravel above.

August 2nd, Friday.
Finally reached the hole that Mr. Howard had dug last summer. French was about 7 ft. wide at this point, possibly a little wider, we found the layers, as we described them. The top layer of rat-dung, dirt, stones 2 1/2", the dung layer about 3 ft, the top portion being burnt, 2"-4" below this two layers of sticks and stones, another layer of dirt, the sloth layer sticks, needles, below this large rocks. Few pine needles, below this, reddish brown dirt, stones, pure lime? with no bones & sticks. We dug down below the level Mr. Howard reached, about two feet and the last two layers were those we found. We carried this level on back, the sloped up as we went back.
Three feet back of datum point the layers varied somewhat.
Ash - 4 in as found; Burnt Dung 7 in.; Unburnt dung, stones and needles 10 in.; Crushed stone 2 in.; dung and stone 4 in.; pine needles, dirt few sticks rat and deer dung 6 in;

large white socks, few pine needles and rat dung, and below this reddish brown dirt and stones.

August 5th Monday
Made the trip through the Carlsbad Caverns, a marvelous experience. Remained to see the bat flight. Will try and make arrangements to collect some of the bats for the Academy.

August 7th
By this time we carried the trench back to where the Cradle Burial was removed. Along side of the hole left away from the wall we found another log 4 ft 7 in. long, embedded in rat dung and rocks, many pine needles in the left dung. The log was six inches in diameter at the largest point.
Back of the Cradle Burial in the top layer of ashes as we found it, 2½ ft from wall, found a deer jaw small portion of [illegible] jaw

both burnt.

August 7th Friday.
Found a ball bound with yucca string and human hair string, in the rat dung layer close to wall 2"-3" down in dung & ashes, 12 ft 5½ in. back of datum point on North wall.
Close to the ball were several pieces of yucca tied, possibly were originally around ball. Close to this 1 ft. from wall 2" down in ashes a black stone arrowhead, not typically basket makers. Also a piece of cane, hollow, chipped evenly at both ends 3 11/16 in long. (possibly [illegible])

August 14th Wednesday.
Cleared away the [illegible] part of the dirt in the North bed, down to the burnt dung layer. Found part of a large sandale 8 ft from back of cave, 1 ft from wall and [illegible] below layer of ashes. Close to this was a round white stone, smooth somewhat egg shaped. Another unusual stone, a small black

ery shaped one was found close to the deer jaw and the ~~[illegible]~~ tooth in ashes. The sack part was partially dug but the layers were apparent, the top part was rat dung below this was a layer of ashes and below this burnt dung.

August 15th ~~[illegible]~~ Monday. We cleared away the greater portion of the south side of the cave. Having removed the disturbed area from the south trench back to the partition of the cave, we found several pieces of human skull, a portion of a human jaw all unburnt, ear of corn and rush, also a rib with several lines cut in it.
The south side itself was mostly rat dung, cactus and very fine dirt. Close to the south wall 5-6 in back of datum point from the surface down to 2 ft were a great many bones of various pieces, there was also a piece of basket and bone flat shape, some bound.

The South lake had a sharp projection running still further back but nothing was found there. When this section was cleared away, down to 3 ft below datum point, the dust, very very fine, gray, that felt like flour, was apparently two feet deep and below this rocks, we only dug a small hole, and there seemed to be absolutely nothing but dust. Picture we took show the back part of the cave at this point.

August 16th & 17th Friday & Saturday.
We spent two days at a cave about a half a mile above Smith Spring back of Trifale. The cave is about half way up the Mountain from Trifale elevation 5400 ft. and the Guadalupe Hts. there are about 5,000 ft. We took picture of the cave the rock wall used to have painting on it but had been shot away by some caller. We obtained a copy of a blue print of the drawing from Mr. Smith, the print having

been made before anyone had destroyed them. The cave was more or less of a lege of rock with two narrow passages at either end leading into small chambers. The one on the south side, the cave faced east, led into two small rooms, the ground was composed of decomposed limestone from the ceiling, very dry & very fine as in Williams Cave. We dug simultaneously in both rooms, the digging was made more difficult because the dust got in the Coleman lanterns and made it so dim you could hardly see, we had to take it out in the air to recuperate every 15 min. or so. The dust however was so bad even with masks we ourselves had to get air that often too. The cave had been more or less sealed up with stalagmitic formation. So that very little was in there. Found some bones possibly brought in by

pack rats and a few others, fragments found down below the layer of rat dung. There had been fires on the surface but whether recent or old it was impossible to tell as there were burnt sotol torches lying around as well as quite a few sticks, also burnt.

After the second day of digging we were convinced that if there was anything there it would be impossible to get at it because of the formation. Infront the ledge of rock was fairly narrow and large rocks had fallen everywhere, what earth there was was very shallow rich and loamy and void of anything but roots & decayed leaves. The vegetation was very dense right up to the ledge.

Aug. 20th Monday & Tuesday. Made out last trips to Williams cave, taking

pictures, making drawings of legs, metatarsi, manos, and other things that were too large to remove, and taking some additional measurements. Found the lower jaw of cat or dog in rat dung at the furthest point, in our trench also two other bones near it. Were unable to find any ashes or other evidences of man having been there below the burnt dung layer.

We reason the ceiling in the back of the cave was so black and when there was so much evidence of fire in the top layers and that the cave had been burned out, there was so much junk, cactus, cow chips etc in it, Uncle Ralph set fire to it and burned it out.

Aug. 23rd Friday.

We spent two days at the task of finding a cave on 1 Ranch, after getting permission from F. Meyers to work the cave and

rather indefinite directions as to how to find it, we found no trace of it the first time but the second day in the middle of the after noon we finally found it with the China tree & hackberry tree the land marks just as we were told it would be. However due to heavy rains that had been pretty regular all over that section the cave or sink hole was filled with water. There were signs of digging there but in the condition we found things nothing could be done at all.

We made another trip up the mountains to a very large cave shaped like an amphitheatre within a quarter of a mile from the rim rock, a terrific climb taking four hours. The cave is used for hurding goats in the winter and will hold 3 000 without crowding. Le Mescalero Apache took us up what trail there was was a goat trail and fierce

We were surprised to see water dripping in numerous places, as we were told it was dry but that again was due to the heavy rains. However we did dig in several of the drier sections but two to three feet down in all cases it was just plain sand.

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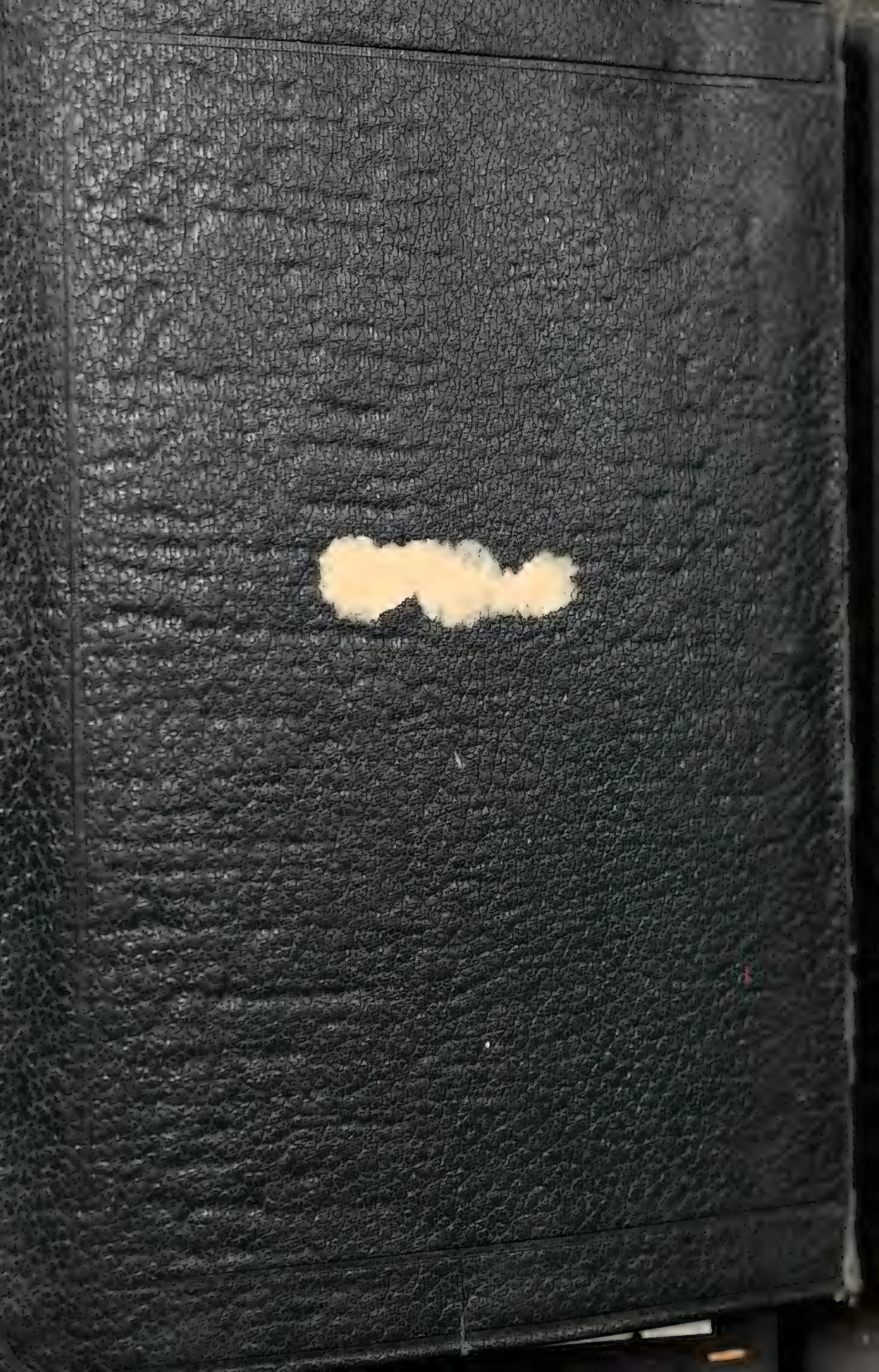

Thos. Cam. Mag. Nat. Hist. (8) [illegible]
[illegible] p. [illegible]

Christian Gardner

Dogs commonly [illegible] other species. Shall broader [illegible] Nasals very broad parallel sided to the point where they join the frontal laterally, instead of evenly narrowing from front to back. Frontal [illegible] broad, much swollen upwards & laterally, then abruptly narrowed at the frontal parietal suture. Sagittal broad much [illegible] backward. Bullae narrow, far over-lapping the heavy paracoccipital process. Teeth much worn down in type, their proportions apparently same as in [illegible]. Dimens. of type (those of broad [illegible] in brackets):—

Ca. L. 153 (130); condylobasal L. 152 ([illegible]) Zyg. br. 98 (84.5) Chas. mesial L. 28 (31) Broad. at middle 19 (17) Interorb. br. 4 ([illegible]) Tip. tip of postorb. proc. 59 (47.5) Fr. immediately behind postorb. proc. 51.5 (40)

March 28, 1938

1834 KALORAMA ROAD
WASHINGTON, D. C.

Dear Mrs Ayer:

I will be at home Monday, April 4, up to 1 PM but will be busy later in the day. Suppose you call up when you arrive at the Union Station, Adams 2639, and then come up to our house at 1834 Kalorama Road or meet me at the National Museum if there are specimens or books to be consulted.

Will be glad to see you and help you if I can

Sincerely

Vernon Bailey

Crossopus himalayicus Gray.

Slate-coloured black with scattered black hairs, which are longer and white-tipped on the sides and rump; lower part of throat and the middle of the belly rusty brown; tail elongate, scaly, with adpressed dark brown hairs above and elongated rigid whitish hairs beneath and brown elongated rigid hairs near the tip; feet rather naked; whiskers numerous elongate, brown; teeth white. Length of the body and head 5 1/2 inches, tail 3 hind feet 3/4 nearly.

Incl. L. 26.
Body Inc. 27.
Hat. Br. 9
Br. Conc. 13.9
Ag. 6.8
Upper Tooth 12
Chin. Comp. 3.5
4/- m 5.5

4 7/16
2 3/4
1 3/16

Siamese Mammals –

19237, 38, 39 –

19179

C. atrodorsalis pranis

Tragulus Javanicus napu

19172-74

Callosciurus hippurus

19240-44

C. caniceps inexpectatus

19171 – 15353

Callosciurus vittatus miniatus

Paraf. x100

19245

Menetes berdmorei berdmorei

15354

Callosciurus caniceps mulleri

17180, 81

C. caniceps inexpectatus

19246-50

Tupaia belangeri belangeri

15317

Tupaia belangeri loatum

17182

Tupaia belangeri olivacea?

6696, 95

Tupaia ferruginea wilkinsoni

Trachypithecus phayrei
Crepesculus

19170
Tomentes Tennis surdus Acc. Pocock 1934 p. 950

15342, 19175
Galeopterus temminckii peninsulae

17188
Tragulus kanchil affinis

19253.

Helictis personata

19255
Mungos siamensis?
javanicus peninsulae

~~Prest. Neglecta Keatii obscura flavicauda~~

19254
Atherurus macrourus

19180
Prestylis femoralis keatii

Whitish Mutant
not topotype of
P. robinsoni
Thomas
acc. Pocock 1934 P.Z.S.
p. 903.

19257
Mungos urva

19258
Paginna larvata janetta?

19177
Paginna larvata robusta

19178
Paginna larvata ogilbyi

Tragulus kanchil hosei —

Sarawak — 14075 ✓
67 ✓
N Sarawak. 73 ✓
76 ✓

Tragulus kanchil affinis
Indo China
15248, 49

Tragulus javanicus borneanus
Borneo
14072, 68, 74, 70, 77 69

Tragulus javanicus napu
Sumatra
1646, 47, 48

Tragulus kanchil kanchil
1649
Sumatra

Tragulus javanicus stanleyanus
Ps. off Singapore

Ann. Mag. Nat. Hist. 1908 (8) II.
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19271 Rattus Rattus Sadeni